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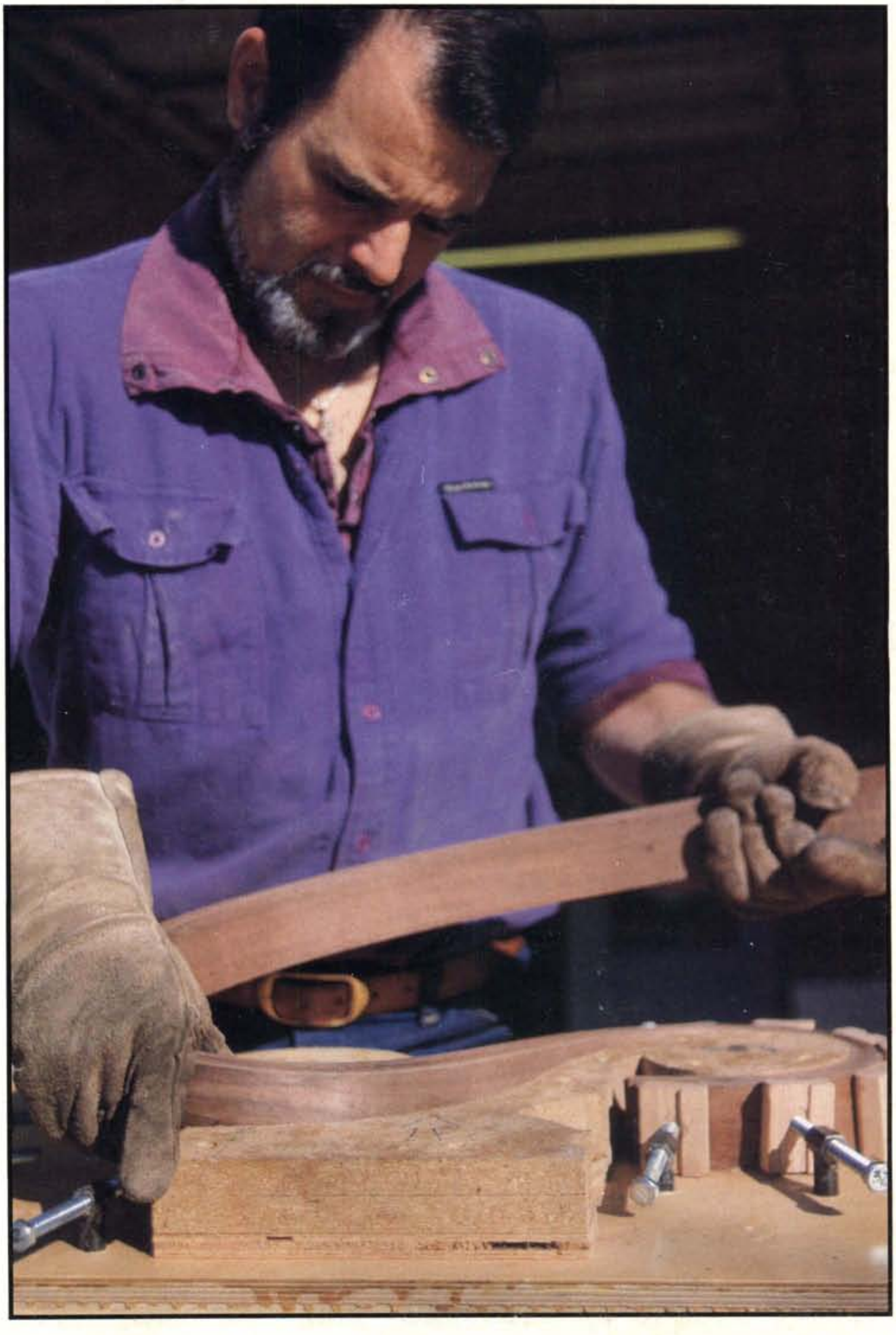

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Popular Woodworking

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On the Cover

Peter Santulli of Circle Tree Woodworking in Sausalito, Ca., wrestles strips of walnut into a bending form after softening them in his steamer. Beginning on page 53, associate editor Jeffrey Burr takes you on a tour of the art of "Bending Wood," with a look at the methods used by Peter and other craftsmen, from boatbuilders to instrument makers and including the furniture of Arthur (Espenet) Carpenter. The techniques shown in this article can be put to use by building the "Snowshoes" (page 32), "Quilting Hoop" (page 60), or "Octagonal Frames" (page 67), which all feature bent-wood construction.

photo by Jeffrey Burr

Clear Cuts

When we decided against replacing our wall–to–wall carpeting, choosing instead to refinish our hardwood floors, we found that every door in the house had a 1-1/4" gap at the bottom. They had all been trimmed so they could easily clear the old carpet, but now they looked kind of silly with enough room to pass a Sunday *New York Times* underneath them. We decided to add a strip of wood to the bottoms of the doors to reduce the clearance to about 1/4".

I brought the seven doors downstairs to the shop and glued on the extra wood, but because magazine deadline was close, I had to spend the rest of the day at the office. My Beloved said that she could finish the job—simply a matter of belt sanding the add–ons flush to the surface of the doors after the glue had dried.

Now, I will plead guilty to charges of failing to communicate. And my point here is not to make fun of Judy's woodworking skills. But the results of this job made me aware of a way of thinking that I use (at least some of the time) that leads to more successful woodworking projects.

My Beloved was not present when I trimmed some additional material off the doors to create a square, straight, flat surface on which to glue my add–on pieces. She did not see me size each piece to make the doors the proper length.

She knew we needed to fill 1" of the 1-1/4" gap, so when she checked my work (not an unwise practice) and found that some of the add–ons were as much as 1-1/2" wide, she went at them with hand plane, time and muscle until each glued–on strip was 1" wide. When she made her way through the shavings to rehang the doors, she found that most still had an unacceptably wide gap at the bottom.

It all comes down to the way you determine your objective. What is the true goal of the job you are about to do? Yes, we wanted to fill 1" of a 1-1/4" gap—but that's not the purest expression of the objective. That doesn't account for other possible factors (such as the trimming to create a good glue joint).

What we really wanted to do was fill an 80-1/2" doorway with a door that left 1/4" clearance at the bottom. I had made ad–ons that would result in doors that were 80-1/4" long.

It is important to distill a situation to its most basic, in order to determine the best way to proceed. If you're making a bookcase, for example, don't base your layout of the shelf locations on just the thickness of the shelves and the space you want between each. If you bear in mind that the bookcase will sit on the ground, and that each end of a shelf needs to be the same distance from the ground so they'll be straight, then you'll take all your measurements from the bottom of the case and not have to deal with books that fall over and slide away.

It occurs to me that this method of thinking can be helpful in other aspects of life besides woodworking, so I've distilled the principle to a pure statement that I find helpful to remember: By finding the simplest way to express a problem, you'll discover the simplest way to solve it.

David M. Camp

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Popular Woodworking (ISSN 0884-8823) is published bimonthly by EGW Publishing Co., 1300 Galaxy Way, Concord, CA 94520. Second-class postage paid at Concord, California and additional mailing offices. POSTMASTER send address changes to *Popular Woodworking*, 1300 Galaxy Way, Concord, California 94520.

SUBSCRIPTIONS:
A year's subscription (6 issues) is $17.00; two years' worth (12 issues) is $30.00; outside of U.S.A. add $5.00/year. Send all subscriptions, advertising inquiries and correspondence to:

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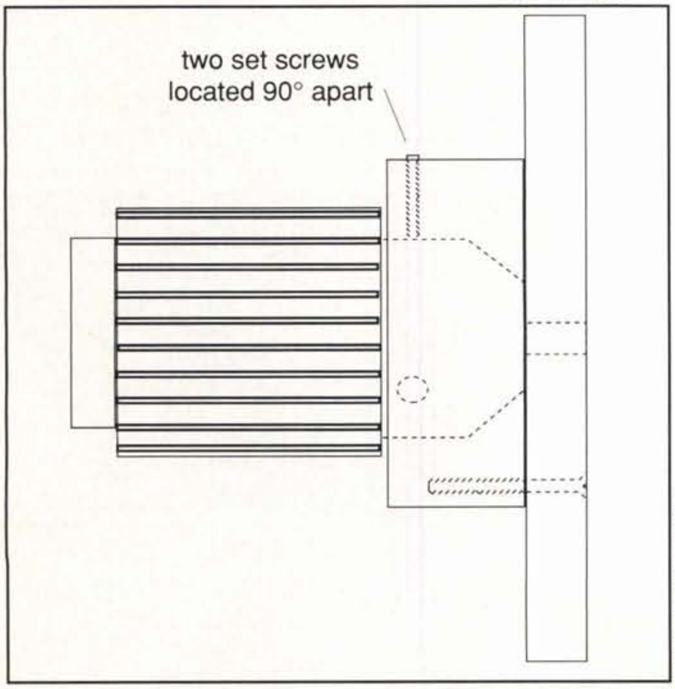
Weird Way to Make a Weird Bowl

The "weird bowls" on the cover of your magazine (PW #43, June/July 1988) caught my eye as I was browsing through a bookstore. They impressed me to the point that I was determined to make one; unfortunately I don't have a band saw or a lathe, and the only work area I have is a carport storage area that is 40" wide and 96" long. I do have a motorized spindle with a 1/2" drill chuck mounted on the shaft. I needed a way to fit a faceplate to this setup. Fortunately, I had retired from a company that had the capability to make what I needed. I went to the head of the engineering department with a sketch of what I had in mind (see below) and he said, "Sure, Norb, no problem." Two weeks later, I had my faceplate.

In the meantime, I cleared some junk out of the carport storage area and made a small workbench at one end. I jerry–rigged a tool rest from some scrapwood and made some chisels out of old files.



Illustrations by Jeffrey Burr

Because of my compact setup I had to scale down my bowl blank to 2-7/8" × 6-3/4" instead of the 3-1/2" × 10-3/4" suggested in the article. I turned the inside and outside according to the instructions, using templates that were appropriately scaled down.

Now I had to figure out how to cut the cyma curve without a band saw. I used tin snips to remove material from the back of a hack saw blade so it would be only 1/4" wide. With the bowl clamped in a vice, I sawed halfway through one edge with my hack saw, then I repositioned the bowl and started another cut to meet the first in the middle. Naturally the cuts on the back side of the bowl did not come together, but they were close enough that with a little patience and some twisting, the halves came apart.

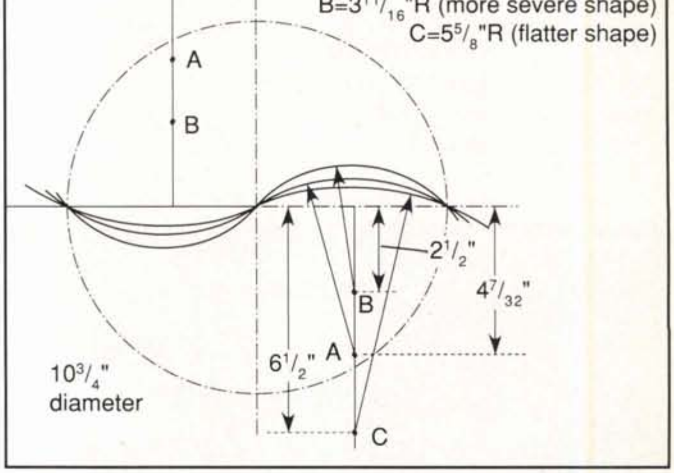
The final shaping was hard work, but when it was done, I entered my weird bowl in a crafts show and it won a certificate of merit.

When I make my next bowl, I want to try something different. Since my faceplate is 8" in diameter, I plan to just screw the bowl directly to the faceplate for the second turning stage and skip the plywood mounting board. When it's time to cut the cyma curve, I'll lay it out on a piece of construction paper and tack it on with glue.

In the article, the author mentions varying the cyma curve to get different shapes. Could he elaborate on this a bit more?

Norbert Coyne
Sarasota, FL

The author replies: *Any cyma curve will work as long as it is symmetrical and passes through the center point of the bowl (see illustration above). Even a straight line will work, making an unusual and attractive bowl that looks like a handled basket.*


A=$4^{31}/_{32}$"R (original curve)
B=$3^{11}/_{16}$"R (more severe shape)
C=$5^{5}/_{8}$"R (flatter shape)
C
A
B
$2^{1}/_{2}$"
B
$4^{7}/_{32}$"
$6^{1}/_{2}$"
A
$10^{3}/_{4}$"
diameter
C

Devore Burch
Fort Worth, TX

Doweling Jig Addendum

Add Trend–Lines, Inc. to the list of suppliers of doweling jigs mentioned in our August/September 1988 issue. They carry the Dowl–It #1000 and #2000, and also the Record/Marples #148. Their address is: 375 Beacham St., Chelsea, MA 02150, phone: (617) 844-8882.

Corrections

In "Country Sconce" (PW #45, October/November 1988) we suggested using a 13/16" Forstner bit to drill the hole for the brass ferrule that holds the candle. Unfortunately, Forstner bits are not made in that size. If you're going to use the ferrule, drill a 7/8" hole; if not, drill a 3/4" hole for the candle.

In our article "Japanese Hand Saws" in PW #46 (December/January 1989) we gave the wrong address for The Fine Tool Shops. Their correct address is: P.O. Box 7091, Portsmouth, NH 03801, phone (800) 533-5305. We regret these errors.

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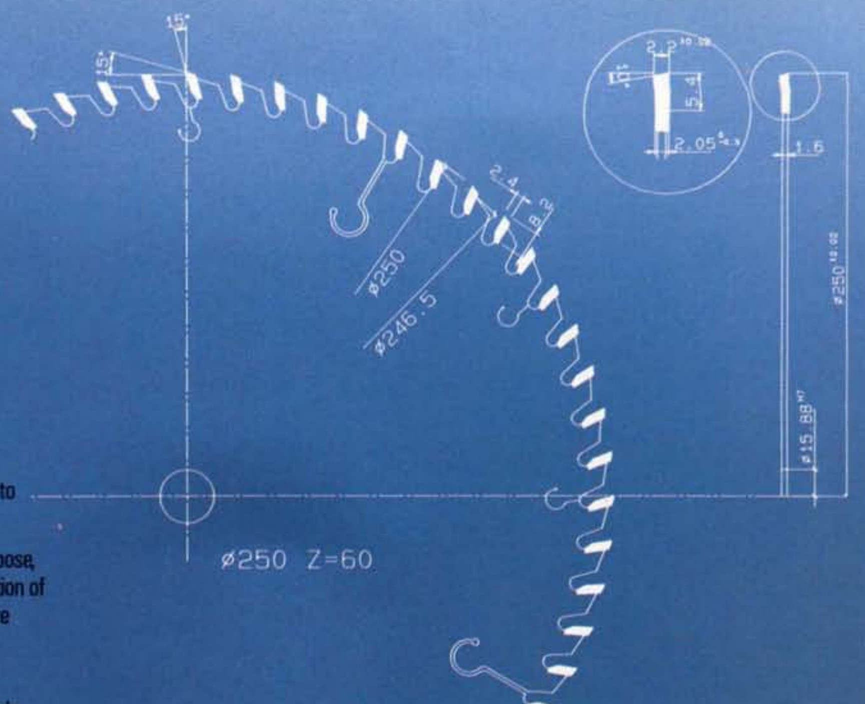

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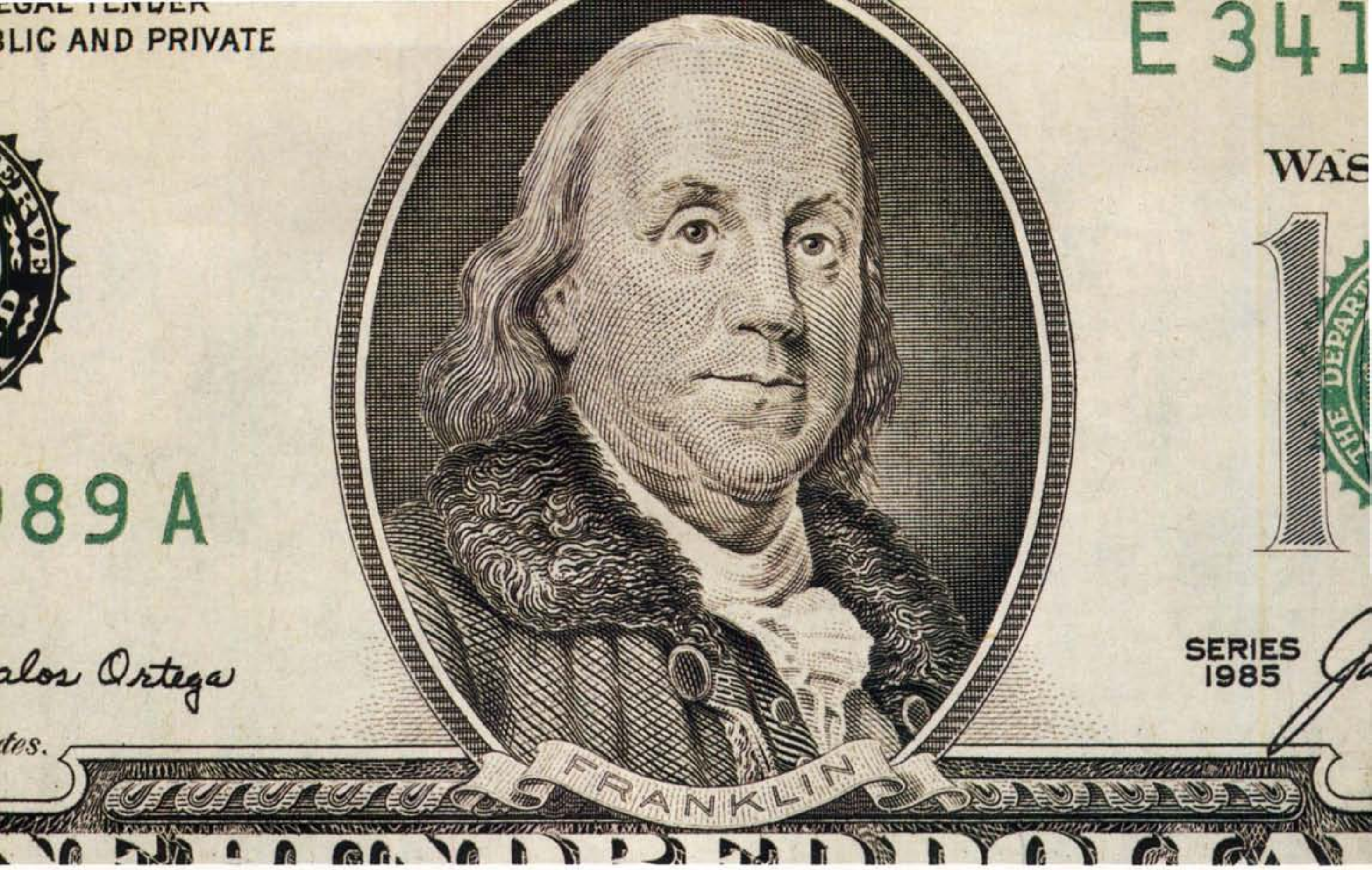

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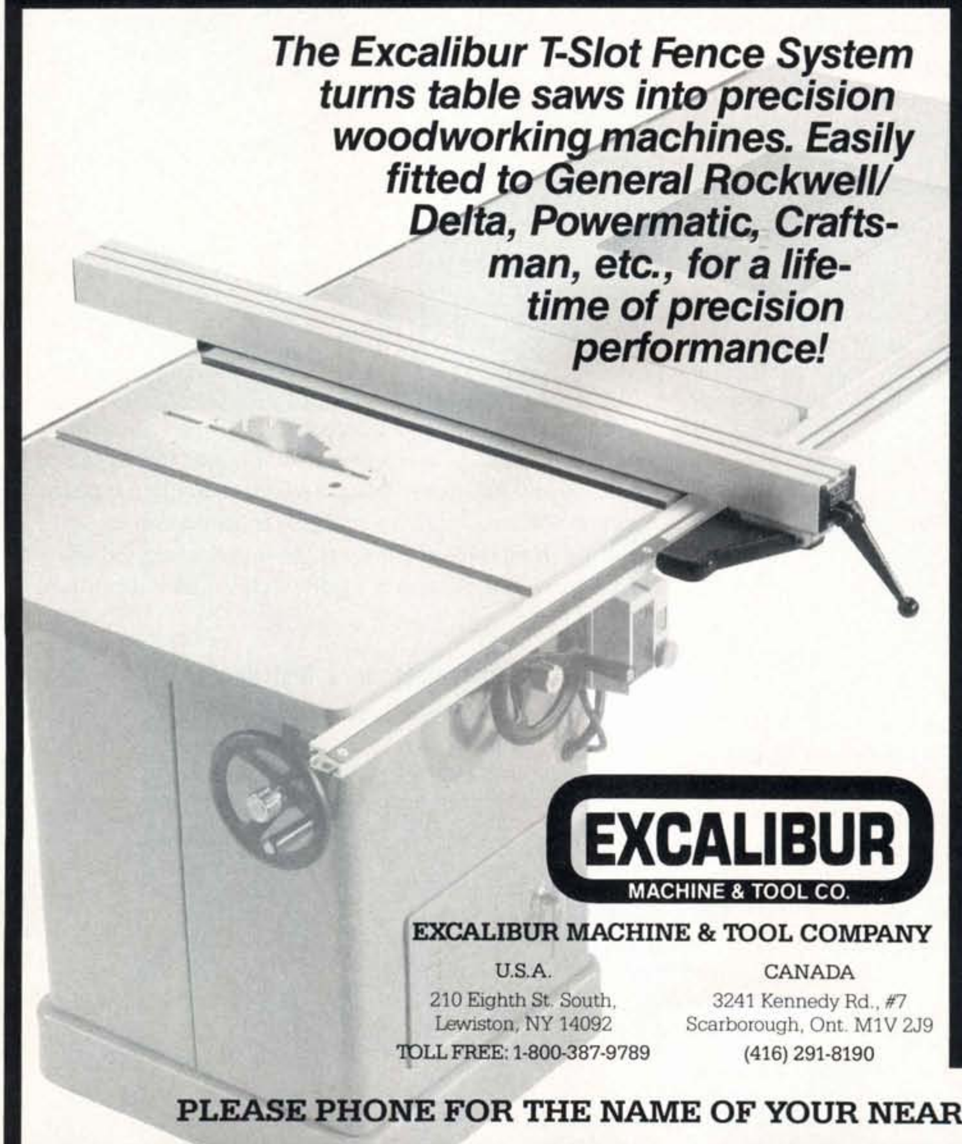

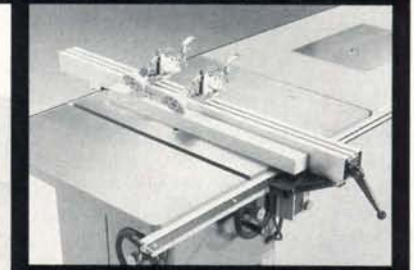

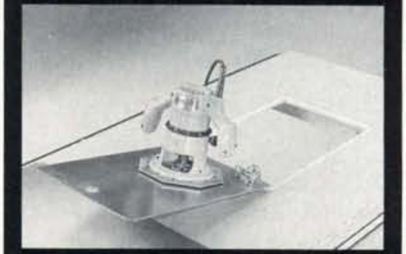

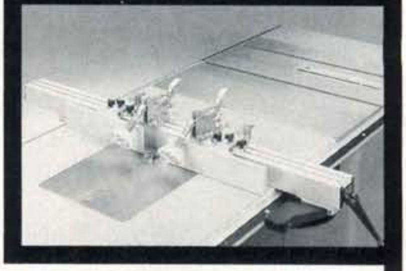

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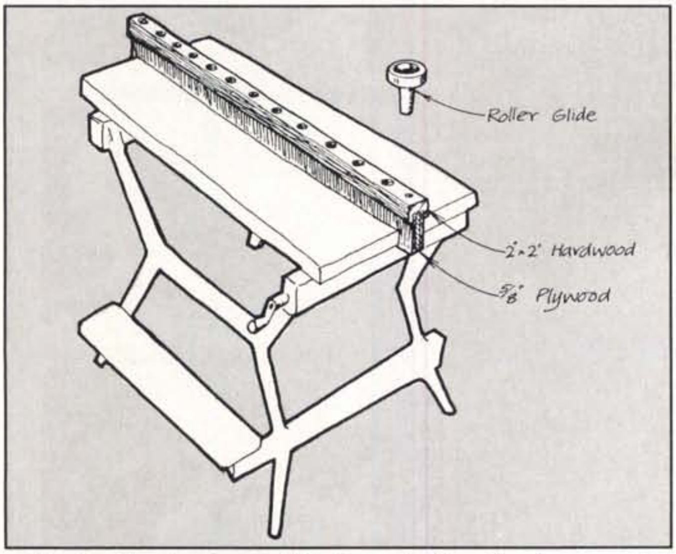
"Tricks of the Trade" shares readers' tips for making woodworking tasks easier and safer. If you've come up with a trick that would help other woodworkers, send it to "Tricks of the Trade" c/o Popular Woodworking, *1300 Galaxy Way, Concord, CA 94520. Include any photos or sketches that help illustrate your idea (we'll redraw them). We pay $25 for each trick we publish.*

Compact Table Saw Support

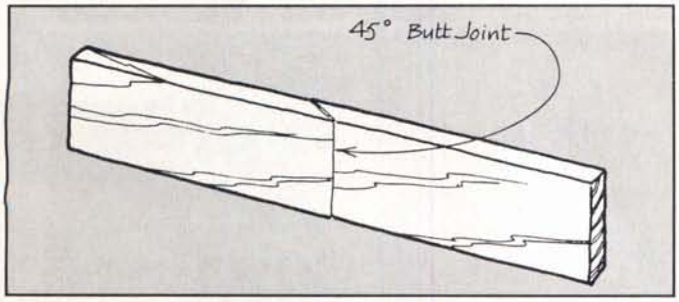
I didn't want to make space for a whole roller stand to support material coming off my table saw, so I came up with this small piece to use with my Black and Decker Workmate®. By using 3/4" ball–roller furniture glides instead of a roller, I can set this up lengthwise alongside the table saw to support material being cross cut. Install the roller glides into a length of 2 × 2 hardwood that has a groove cut in the bottom to receive a piece of 5/8" plywood. Size the plywood so that when it's placed on the cross–table supports of the Workmate®, the top of the roller glides will be even with the top of the table saw.



Jay E. Wright
Chico, CA

Splicing Moulding

When butt–joining the ends of a continuous piece of moulding, such as baseboards, trim the ends at 45°. That way, the end of one board can overlap the end of the other so the joint will be less apparent if wood movement occurs.

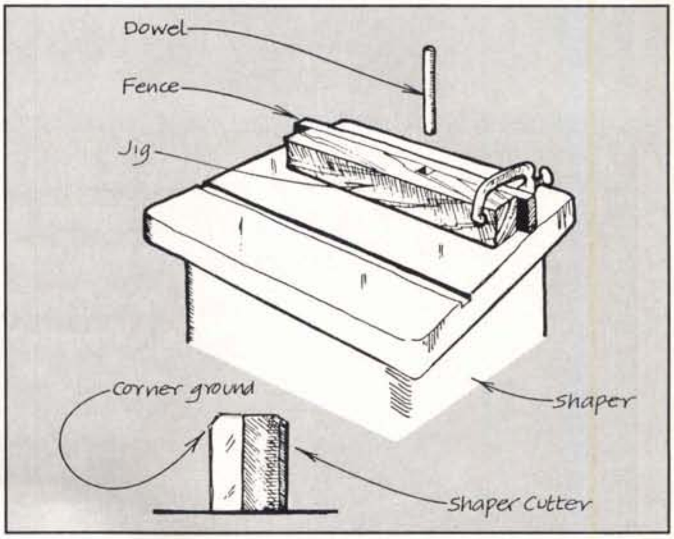


Anne Westbrook Dominick
Hinsdale, NH

Illustrations by Graham Blackburn

Dowel Tenoning Jig

Here's how I use my shaper to cut tenons on the ends of dowels that are to be used for chair rungs: I clamp a board that has a dado cut in it that is as wide and deep as the dowel's diameter to the fence. It should be at least twice as high as the length of the tenon. You may also need to add a wooden auxiliary fence for the cutter to bite into when set up in the proper position.

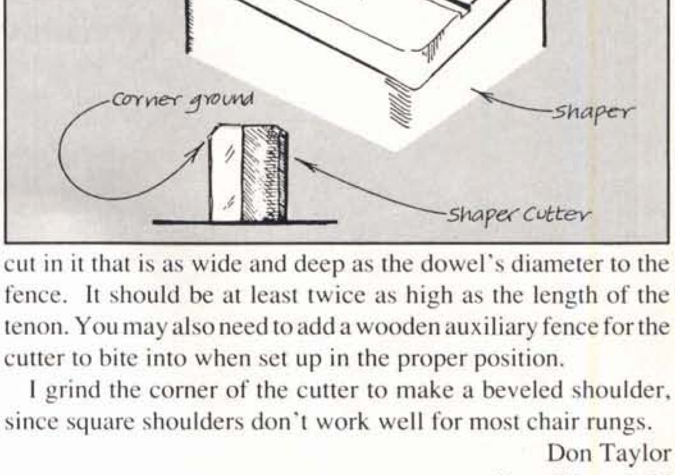


I grind the corner of the cutter to make a beveled shoulder, since square shoulders don't work well for most chair rungs.

Don Taylor
Deep River, MN

Sharpening on a Belt Sander

If you don't have a bench grinder, here's a quick way to restore the bevel on a plane iron using a belt sander. Cut the end of a block of two–by at the proper angle for the bevel you need. Drill a 1/4" hole perpendicular to this angled surface, and countersink the other side to accept the head of a 1/4" carriage bolt.



Lock the iron in place with a washer and a wing nut, then make a few light passes on a belt sander (here we show a portable model clamped upside down in a bench vise). Use a belt that is 120–grit or finer, then finish honing on oilstones.

W. K. Alexander
Richland, WA

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Book Reviews

by Hugh Foster

Woodworking Techniques (Rodale Press Books, 33 E. Minor St., Emmaus, PA 18049) 96 pp., paperback, $9.95

This is a collection of articles from back issues of *American Woodworker*. There is a school of thought that says one ought never to publish review of the competition's books. Another school of thought suggests that we're all in this woodworking thing together, and the more information that's availablethe better. My thoughts are much closer to the second view.

Woodworking Techniques is similar to the many volumes of *Fine Woodworking on...* and shows what we miss when we take our magazines for granted. This volume, which is scarcely larger than an issue of the magazine it anthologizes, presents a world of techniques to beginning, intermediate, and advanced woodworkers. Included here are several articles about dovetailing, another about mortise and tenon joining, one about carcase construction, several about various aspects of carving, several more about wood and wood grading, and several more about wood finishing. Perhaps most valuable of all, there are the best of the "tips" submitted over the years by readers. If you've been a long–term subscriber to *American Woodworker*, and saved your issues, you don't need to buy this book, for you have all of its contents. But you may want to buy it anyway—here it all is, in one place, without the distraction of the advertising, and ready for us to use. In short, it's a handsome, nicely produced volume.

Weekend Woodworking Projects (Rodale Press Books, 33 E. Minor St., Emmaus, PA 18049) 96 pp., paperback, $9.95

Weekend Woodworking Projects is of far less interest to this reviewer than *Woodworking Techniques*. The projects, drawn from back issues of *American Woodworker*, are all intended to be made from the "scrap" in our shops. My shop never has scrap as pretty as I see in some of these projects.

Most of these projects are designed to be completed in a single weekend. Many of the 29 projects are very handsome, but the book contains too many "toy" projects to suit me. Of course, that may be a great recommendation for many other woodworkers. There are projects here for woodworkers of all abilities. I'd recommend this book to you rather more hesitantly than the book about techniques; it's worth its price if it contains some plans that you will actually use.

Trade Secrets: Tips & Hints from the Pros by Gene Schnaser (Rodale Press Books, 33 E. Minor St., Emmaus, PA 18049) 276 pp., $14.95 paperback, $19.95 hardback

It is hard to tell whether Schnaser is acting here as author or editor, but it is little matter to us readers for what he has come up with is an excellent and informative read. Perhaps the total text is too homogeneous to have been written by the great variety of experts assembled here, but their expertise is readily apparent. While not all of the text is devoted to woodworking, all of it will be of interest to handy types; after all, even woodworkers sometimes have to fix plumbing or electrical problems.

Garretson Wade Chinn, namesake of the famous Garrett Wade Tool Company, contributes a section about selecting hand tools; John Juranitch adds a chapter about sharpening; Pat Spielman tells about routing; Homer Formby tells about restoring and refinishing furniture. And these are only four of the twenty–six chapters!

The book's avowed purpose is to help eliminate the modern tendency to keep specialized knowledge to ourselves rather than share it freely. No one is an expert on everything, and we shouldn't have to feel intimidated because someone else knows more about something than we do; the best approach is to just go ahead and ask those dumb questions. Here, Schnaser has asked them for us. He has asked the right people, and his compilation of their answers is masterful. No, the book won't make you a master plumber, electrician, finish carpenter, or what–have–you, but it will give you insights into intelligent ways of working that have stood the test of time. I'd recommend you spend the extra $5 for the hardback edition; you're likely to use it enough to destroy the paperback in too short a time.

The Razor Edge Book of Sharpening by John Juranitch (Warner Books, 666 Fifth Ave., New York, NY 10103) 145 pp., paperback, $12.50

John Juranitch is an interesting fellow and an awfully good writer. He knows more about sharpening than just about anyone I've ever known of. Except for this one, there aren't really any good books about sharpening available, and this one isn't particular about *woodworking* tools. He treats sharpening the axe, the plane iron, the chain saw, and the adz; everything else he treats falls more into the category of sporting goods: fish hooks, sheath knives, arrowheads, and the like.

The introduction is great. You learn right away that Juranitch not only knows how to sharpen, but also knows how to teach someone how to sharpen. It contains a photo sequence of a sharpening contest which pits a pair of pre–teen girls against a trained professional barber. The girls start with dull hunting knives and the barber starts with a sharp straight–razor. They sharpen their weapons, the girls lather up the author, and then proceed to shave him faster than the barber can shave the other "victim." Of course you learn something else about the author—he knows how to promote himself: There's even a photo sequence of the author shaving himself with a double–edged axe.

Even if you don't care for the author's glitzy, self–promoting style, the general instructions about what is sharp and the specific instructions about various tools will prove to be at least as valuable as even the best in–person sharpening lesson you've ever had. With hundreds of illustrations and carefully honed text, this pro shows us how to put a keen edge on the dullest tools.

Router Jigs & Techniques by Patrick Spielman (Sterling Publishing Co., Two Park Ave., New York, NY 10016) 383 pp., paperback $14.95

Hugh Foster is an English-teaching woodworker in Manitowoc, Wisconsin.

With 776 drawings and photos, this has to be the best thing for router users since Spielman's *Router Handbook* came out a few years ago. There's not enough room in a simple review to even list all that's available in this volume. There is a section about bits, and there is a section about the commercially available jigs and fixtures. More interesting than these, though, are the sections about shopmade jigs, fixtures, and useful devices. So is the section about "the ultimate router table," which is not like any of the commercial models you've seen and equally unlike most of the plans offered in the magazines. Is it *your* ultimate router table? I can't answer that question for you. What I can say with certainty is that this large, handsome volume will show you how to do the things you do now with the router faster and more safely, and it will also show you how to quickly and safely accomplish some routing tasks that you may have thought were impossible. This book may deserve space on the shop shelf even more than the author's *Router Handbook*. It's a goldmine of router information.

200 Original Shop Aids & Jigs for Woodworkers by Rosario Capotosto (Popular Science Books/Sterling Publishing Co., Two Park Ave., New York, NY 10016) 358 pp., paperback, $14.95

Originally published by Van Nostrand Reinhold in 1983 as *Capotosto's Woodworking Wisdom*, this republication again makes available this collection of the best ideas of a lifetime's woodworking and writing about woodworking. The three sections of the book are "Making and Using Jigs and Aids," "Tips and Techniques," and "Projects." Appendixes treat the important topics of shop safety and specialty hardware. The first two sections are organized by tool, and the projects which take up the last forty per cent of the book are included specifically because they illustrate techniques that woodworkers should know about but may not know.

This book, like Spielman's *Router Jigs & Techniques*, will be kept in my comparatively small in–shop library. In terms of "bang for the buck," these two, like Schnaser's *Trade Secrets* (reviewed above), have to be among the very best woodworking books of last year.

Shaker: Life, Work and Art by June Sprigg and David Larkin ©1987 (Stewart, Tabori, & Chang, 740 Broadway, New York, NY 10003) 272 pp., hardback, $40

Recommended by a woodworking friend in a distant city, *Shaker* came to me as one of those odd, uncategorizable books. It doesn't quite belong just "on the coffee table," for it practically insists that we read it. It isn't really a book about woodworking, and there are absolutely no plans here, not even a measured drawing. But there are about eight dozen sumptuous color photos that are certain to inspire a woodworker to head for the shop. With John Kassay's *The Book of Shaker Furniture* (Amherst: The University of Massachusetts Press, 1980) and Tomes Moser's books about Shaker furniture, *Shaker* gives the why that some of us need to go with the how that will enable us to build these worthy original American projects. Successfully completing Shaker–style projects probably requires that we adopt the Shaker mindset—at least in the shop—and no book explains that mindset as well as this beautiful volume. PW

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Videoscene

by Alan Marks

Faceplate Cabinetmaking, a series of five video tapes with Roger W. Cliffe, ©1988 by Roger Cliffe, distributed by Vid–Wood Publishing Co., P.O. Box 116, DeKalb, Illinois 60115, $29.95 per tape—excluding the tape on advanced door construction which retails for $34.95

This five–part series covers a particular form of cabinetmaking which utilizes faceplate or faceframe construction. This method is predominantly used in this country for commercially produced kitchen cabinets; however, European–style construction (32mm), which does away with faceframes altogether, is starting to be used here more and more. It also lends itself for use in commercial casework construction for freestanding cabinets. In either case it enables manufacturers using combinations of hardwoods and veneered plywood to choose between varieties of decorative surface and edge treatments.

In the series, Roger Cliffe presents this cost–efficient industrial construction in adaptation for use in home projects or possibly the small commercial shop. Besides having written and published three books, this prolific author bears the title of Professor at the Department of Technology, College of Engineering, Northern Illinois University. Please be advised this is commercial–grade furniture, not gallery quality. Those interested in making the three projects used for illustration—a hall chest, a nightstand, and the stereo cabinet—would do well to purchase *Table Saw Techniques* and/or *Radial Arm Saw Techniques* by Roger Cliffe in which detailed plans are printed.

The tapes may each be purchased individually, and I am going to discuss each of the five in detail.

Building the Cabinet, 53 minutes

Cliffe begins the construction of a nightstand with one drawer and one door by starting with the faceplate. He cuts out five interchangeable pieces to serve as rails and stiles. He determines the placement of these pieces on the basis of which side shows to best advantage and what defects need to be hidden. Most other presentations neglect this important consideration.

Cliffe delivers for the most part a very competent, convincing demonstration of the methods he uses. Some of those methods seem to me a little shortsighted. I suppose belt sanding with portable tools has its applications, but I question the wisdom of using it on pieces which must keep the same exact thickness for future machining operations. I feel hesitant to endorse this procedure. Cliffe uses wood blocks directly over clamped glue joints in complete realization that he will have to most probably shave them off when the joint has dried. It would have been so much easier to sandwich pieces of wax paper between the blocks and the joint to save the bother.

It shocked my sensibilities a little to see him use a pneumatic nailer to fasten the faceplate, as well as at other points during the assembly. Not that I wouldn't use one if I had it, but I don't like to set nails and fill nail holes on anything resembling fine furniture. I wouldn't mind doing it on painted kitchen cabinetry, however.

After gluing and nailing the faceplate to the carcase, he used a router with a ball bearing flush–trim bit to trim the solid wood flush with the plywood sides. This is an excellent production method when used with some woods and some types of grain or with plastic laminates. But I have encountered tear–out and splintering under certain conditions, and I think these dangers should have been pointed out.

Cliffe's procedures have validity within a context. Some are extremely cost–effective. The limited choice of power tools accurately reflects what might be found in the average hobby workshop. If small production cabinet shops are not using some of the techniques he presents, they probably should be, but many of them have no legitimate place anywhere but in the home workshop.

This first tape sees us through completion of the carcase plus top. Drawer construction is the topic of the next video in the series.

Basic Drawer Construction, 48 minutes

Actually, two videos in this series deal with drawer construction. I suppose the real distinction between them lies in what is covered in one video but neglected in the other. *Basic Drawer Construction* covers nomenclature, the different kinds of drawers, plus the various available options in materials for sides, fronts, and bottoms. It mentions several ways of joining drawer fronts to sides, as well. Next follows a demonstration on using the table saw to cut drawer joints for a drawer which is then assembled. To me this was the most confusing part of the entire series. Close-up shots were poor, and I had no idea which of the various joinery constructions he had chosen to assemble.

A comprehensive section about selecting drawer slides followed, with a discussion of what the various options were for slides. There then followed a good section on drawer pulls, which I also appreciated.

Except for the one confusing segment, *Basic Drawer Construction* seemed more a rundown of options than it did a demonstration of how to build drawers.

Advanced Drawer Construction (Building the Drawers), 54 minutes

My review copy's jacket labels this tape *Advanced Drawer Construction*; the tape itself bears the title *Building the Drawers*. This seems to me to be a more suitable title, since hands–on building takes precedence in this video. Anyone using this series who wants to actually build drawers, in addition to merely learning about them, will need this video in addition to the previous one.

In it, several ways of fastening sides to fronts are covered using sliding dovetails as well as two forms of interlocking joints involving rabbets with dados. The easier of these two appears to me to have very little strength unless combined with nailing or pegging. All these joints are machined; consequently dovetail devotees will need to look elsewhere for guidance. Manual operations receive very little attention. In fact, as I recall, there

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***Alan Marks** is a cabinetmaker in Carmel Valley, California, and a contributing editor to* PW.

is only one instance in this whole series where a hand plane is used.

Basic Door Construction, 54 minutes

We are introduced here to three basic cabinet door types: the flush door, the rabbeted or lip door, and the overlay door. Doors are further divided up into ones with the panels rabbeted in from behind, those held in place by moulding strips, and those with panels held in grooves.

The two types of doors that are dealt with in some depth are those with lapped joints and those with mortise and tenon joints. The remainder of the tape deals with measurement and layout techniques, and demonstrates methods for cutting rabbets and lap joints with router, table saw, and radial arm saw.

There is no explanation of any sort given on how to use any of the tools employed in the series. It is assumed that the viewer has a basic familiarity with their use.

There is also a demonstration using a moulding cutter and table saw for cutting quarter–round panel moulding as well as a portion on mitering mouldings for plywood doors.

Advanced Door Construction, 82 minutes

I valued this tape more than the others because I had never seen the construction of a haunched mortise and tenon joint before. The exposition here was probably the best in the series. Cliffe covers this type of joint in detail, though he missed covering one step in the tenon–cutting process.

He cuts his mortises using two methods: one involving a doweling jig and one a drill press and mortising bit. He neglected to point out that he was using a brad point drill for the former or a mortising bit for the latter; such information could be of vital importance to the success of the project.

He demonstrates resawing a board to construct a book–matched panel using a table saw. He says that if you don't get the two halves identically thick and don't have a planer, you can use a belt sander to thickness the glued–up halves. I can't imagine doing an accurate job of it with a belt sander, but I must confess I haven't tried.

Cliffe then shows how to raise panels on the table saw and on the radial arm saw using a dado head for the latter. When it comes to sanding the cuts, he uses an orbital palm sander without a dust mask (choke!). Come glue–up time, he squeezes a few drops into the mortises and puts none on the tenons. I would like to have seen glue spread on the mortise walls with a small stick or brush and on the tenon surfaces as well. Finally, he shows us how to fit a flush door, install mortise hinges and mount it. Then he repeats that operation for an overlay door with surface mount hinges.

This ambitious series of five is, despite its shortcomings, the best available video guide to making faceplate kitchen cabinets. I think small production cabinet shops could benefit from some of the techniques, and the do–it–yourselfer may feel encouraged to tackle that kitchen remodel. The subject could be covered even better, with more clarity and better organization, but I feel pleased to finally have something of its ilk to recommend. PW

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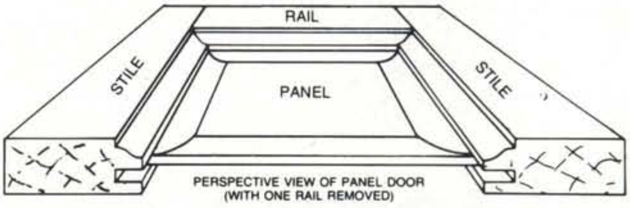

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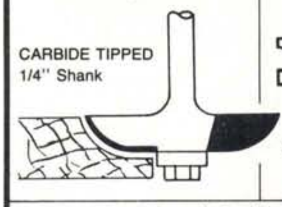

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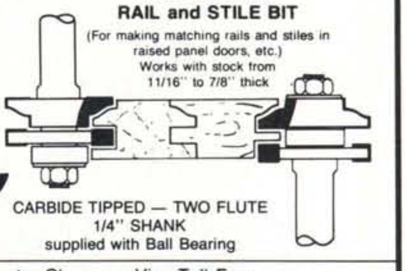

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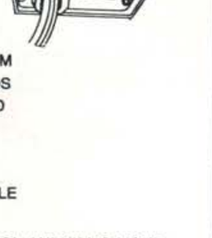

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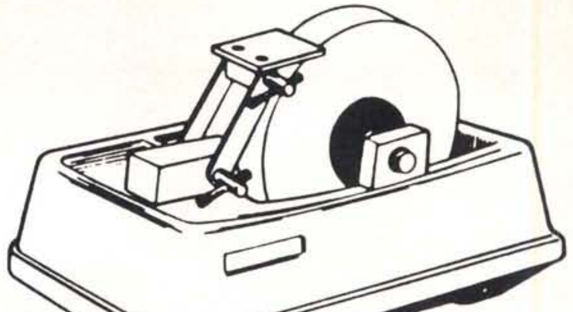

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The Business End

by Peter Good

Taking Home the Gold

If you read my last article "Pricing Your Work" (Issue #45, October/November 1988) and followed my procedure to arrive at a unit price for your work, such as an hourly labor rate, you may have come to the alarming realization that you have to increase your prices—perhaps substantially—to properly accommodate your business and personal financial needs. The element of alarm would probably come from the fact that increasing your prices might put you above the competition to the point where you might lose business by bidding too high, sending you into a downward economic spiral. As I mentioned in the closing lines of that previous article, two ways you can correct the situation are to upgrade the quality or uniqueness of your work to make it consistent with a higher price, or determine what the flaws are in your business that force you to be so high–priced, and eliminate them.

First, let's examine the idea of raising the quality or uniqueness of your work. Switching to top quality materials and techniques can be a definite selling point, since it is precisely what many buyers are looking for. Using only the finest grades and species of wood, the most durable glues and finishes and the most reliable methods of joinery can go a long way toward successfully making a sale, especially if you can make your customers aware of these features. People appreciate as much information as they can get to help them make a purchase decision and will give you high marks if you explain exactly why you use the materials and techniques that you do. They like to know that you are making every effort to provide them with a dependable, high quality product and that you make no compromises in the production process.

Another technique that will differentiate your product from others involves moving it forward or backward in time. This means making a commitment to either embrace the past, as in creating faithful reproductions of period work using the original materials and methods of construction; or going forward, staying on the cutting edge of design and technology. Both methods work well because of our reverence for the past and our fascination with the future. In either case, you will move out of the vast middle ground where most woodworkers tend to plant themselves, perhaps because there is comfort in familiarity.

The way in which you use materials is another area to explore in your quest for uniqueness. The idea, remember, is to be different. Consider using materials from other countries or cultures, or materials which would be considered nontraditional. Granite countertops and teak bathtubs are examples of this. Also, many materials from other parts of the world that might be considered quite mundane in their country of origin can seem quite exotic here, simply because they don't occur here. Also, think about using materials in nontraditional ways. How about marble arms for wooden chairs? Glass drawer fronts? Padded leather cabinet sides or inlaid metal trim in stair rails or wall paneling? Many customers appreciate a fresh or unusual approach to the use of materials.

How about searching for a niche in the market which is not currently being filled? This may take some imagination and research, but it could be your ticket to greater financial rewards. Think creatively about what the possibilities are. I know of woodworkers who have done such things as making dashboards for luxury cars, attractive wood presentation cases for fine wines, custom music stands and wooden sinks. With some imagination and observation, you may be able to find some need which is not currently being filled. Another thing along these lines is to offer unusual or exceptional service. This can take the form of night or weekend service, or setting aside time so that you can offer same–day service on certain things. Delivery and installation are other possibilities. Since effective selling is basically theater, there are endless things which you can do to increase the appeal of your products by performing special services for your customers.

Perhaps the pricing required to make ends meet and also make a profit is too high for your liking, and you don't want to be unique or exceptionally upper end, and don't want to perform any extraordinary services; you just want to be able to get your prices down and still live reasonably well. The thing to do is to look at the reasons why your prices have to be so high and eliminate the problems. The areas to look at can vary greatly from one business to the next, but I'll discuss a few typical sources of problems.

The first is inefficiency. In woodworking, this can mean the poor use of shop space or production areas. Equipment and work stations should be arranged in such a manner as to minimize the movements of people and materials. This involves devising a flow pattern so that material and jobs move in one direction through your shop. People should be able to do as much as possible without leaving a work station. Ask yourself, "What is the fastest and least laborious way to accomplish this task?" Materials should be readily available. If there is more than one person in your shop, give some consideration to the separation of tasks to avoid any duplication and to have the job done only by the appropriate person.

Poor planning is another area which might need attention. This can mean improper scheduling, causing a lumpy work flow, duplication of activities and work stoppages resulting from failure to make provisions for tool and equipment maintenance. One of the biggest planning deficiencies, however, is the failure to understand or accept the fact that in order to stay healthy and prosper, a business must change with the times. It's important to observe trends, economic indicators and the general direction of the industry. New techniques and products should be given careful consideration. Such concepts as the 32mm system of cabinet construction and the purchase of furniture components from other sources are things which may make the difference between successfully competing in the marketplace or becoming a business failure statistic.

Poor management–employee relations can also drag down the economy of a business. If an employee does not feel in any way invested in the business, he can hardly be expected to take much interest in its future or economic state of affairs. Such seemingly simple things as good communication, compensation and working conditions can mean the difference between an

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As owner of Grand Openings in Oakland, California, ***Peter Good*** *manufactures doors. He also gives seminars at national woodworking shows on the business aspects of running a small shop.*

employee who is genuinely concerned with and involved in the growth and prosperity of a business, and one who is just putting in time.

Finally, there are the obvious things to look at; such as poor financial and marketing practices. Things like cash flow, debts and accounts receivable cannot be ignored. If you are uncomfortable with these or tend to put them somewhere near last place on the daily list of things to do, perhaps you should consider working with an accountant. No one can be expected to have the time or talents to handle all aspects of running a business; and for many business owners, it's a wise move to use the help and skills of others in areas where he may be lacking. Financial advisors can also offer much useful information on such matters as fronting money for materials, being aware of overhead, investments in inventory and expenditures for equipment. Marketing advisors can help with things such as advertising, promotion and the formulation of a marketing plan.

To determine what the problems in your business may be, it will take an open mind and some careful analysis. We often tend to brush off this analysis with the excuse that we don't have time for such things and that the work at hand is of much greater importance. Sometimes we tend to ignore the problems until the situation becomes so serious that only extraordinary measures will reverse a destructive trend. If it appears that prices must be unrealistically high for a business to survive, it may be time for a careful examination of how one is running the business. Hopefully, it won't be too late. PW

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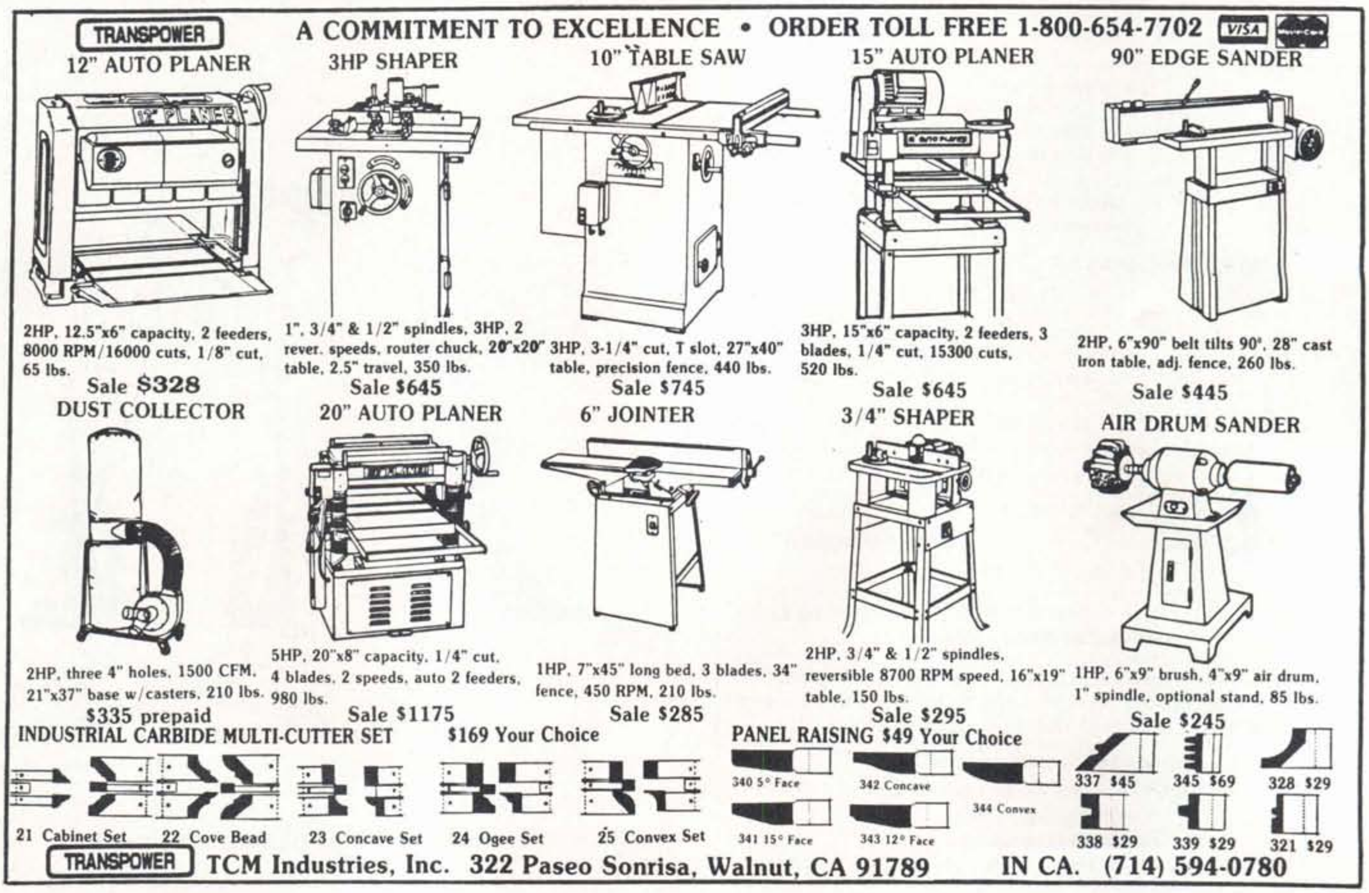
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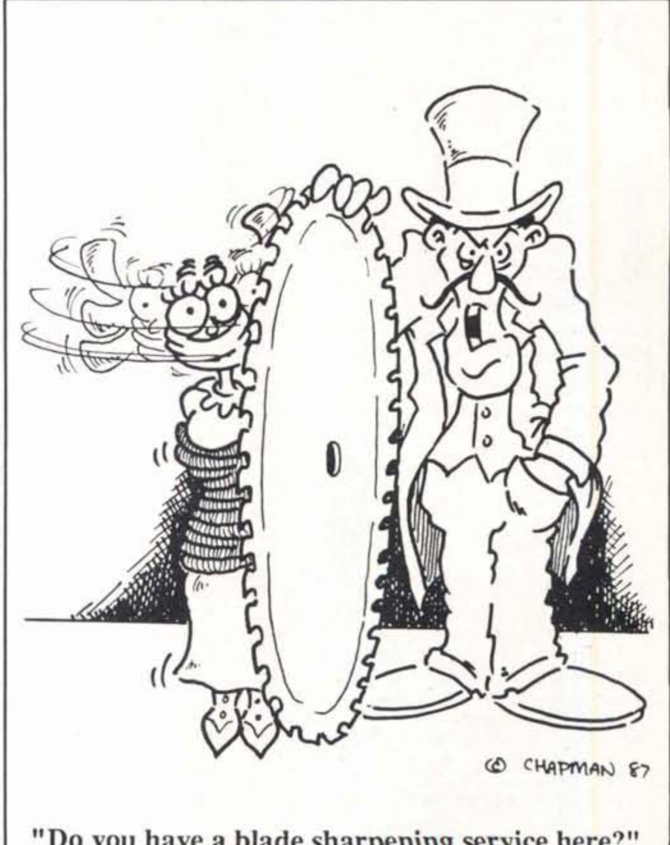

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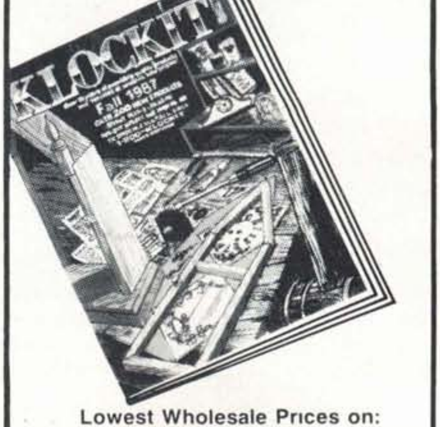

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Tests & Comments

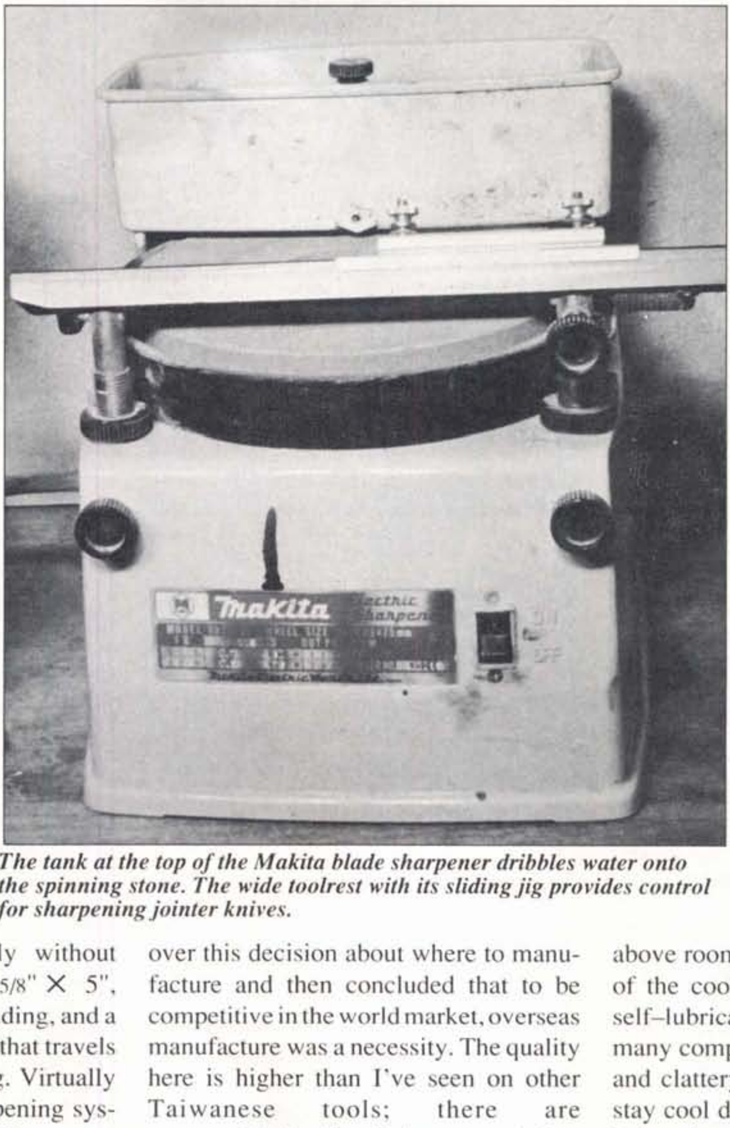
by Hugh Foster

Three Useful Wet Grinders

Knowing that a tool should be sharp and getting it sharp are two entirely different things. My first attempts at sharpening were made with a standard two–wheeler bench grinder, the kind that is easy to find in hardware stores. It didn't take me long to learn that I was far too heavy–handed to grind my own tools on one of these without burning the temper right out of them. Next I got a hand grinder. It was safer for the tools, but watching me grind them must have been the next best thing to a circus: I felt like a fool, for I wasn't sufficiently coordinated to hold the tool at the proper angle and crank the wheel at the same time.

One year, Santa Claus bought me a Makita 9820 blade sharpener that I had asked for. It did an excellent—albeit slow—job, but I prefer a slight hollow grind to the flat–ground surfaces the Makita makes, so the search was on again. This is not to imply that I wish to be rid of this otherwise rather remarkable machine, but rather that speed is not among its virtues. If you learn to operate it properly, you will be much more likely to swear by it than at it; now that I've got it figured out, I assure you, mine is not for sale.

The very next grinder I found was Delta's 23–700. This grinder appears to be one of the two best things currently available for letting clumsy craftspeople sharpen tools fairly speedily without burning them. It has a small 5/8" × 5", high–speed wheel for fast grinding, and a 2" × 10" water–cooled wheel that travels only 70 rpm for safe grinding. Virtually every alternative to this sharpening system will either cost at least 50% more or demand a level of skill, practice, and muscle memory that most of us will never have.



The tank at the top of the Makita blade sharpener dribbles water onto the spinning stone. The wide toolrest with its sliding jig provides control for sharpening jointer knives.

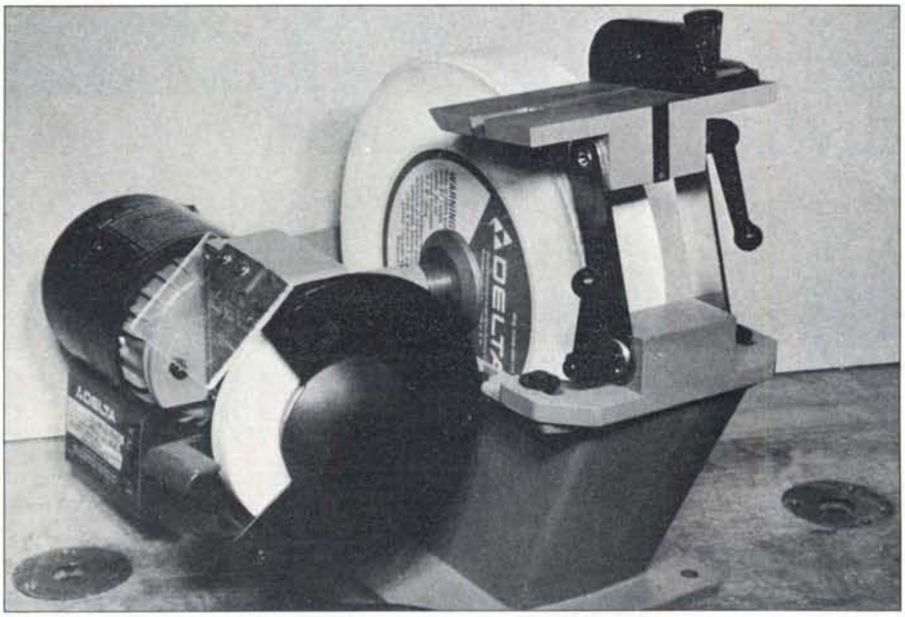
***Hugh Foster** is a woodworker in Manitowoc, Wisconsin and a contributing editor for* Popular Woodworking.

Easing up on our muscle memory is what the Delta engineers had in mind when they designed the adjustable tool rest; this can be easily adjusted for position and angle relative to the stone, and its sliding miter gauge helps to ensure square—or any other desired angle—grinding. One could be almost ignorant of sharpening technique and still get good results with this tool.

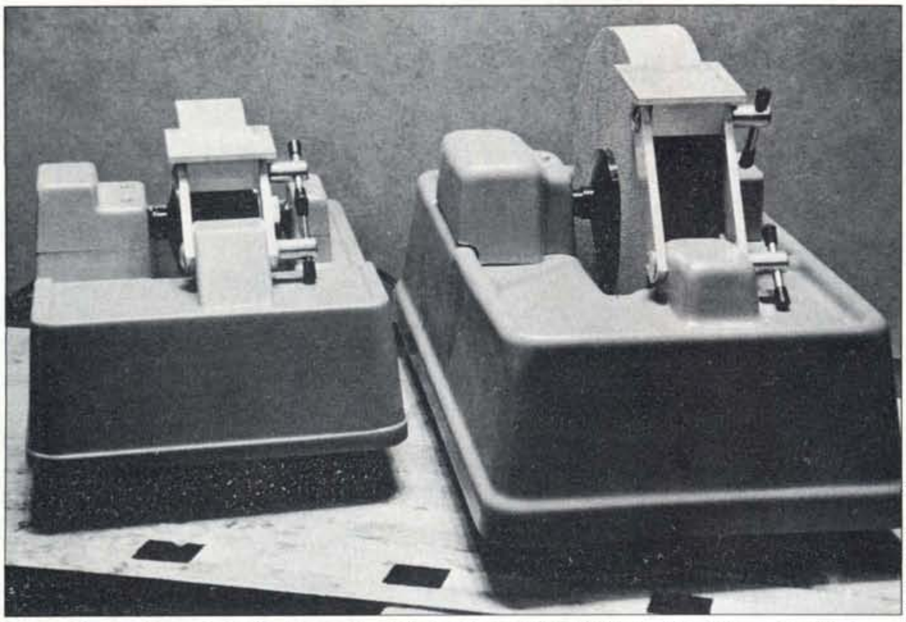
Some America–firsters will be unhappy that the unit is manufactured in Taiwan. Delta has probably agonized over this decision about where to manufacture and then concluded that to be competitive in the world market, overseas manufacture was a necessity. The quality here is higher than I've seen on other Taiwanese tools; there are comparable–looking Taiwanese grinders for less money, to be sure, but caveat emptor (let the buyer beware!) may be good advice unless you get a chance to inspect the exact unit you'll be taking home for piddly little details, like squareness. My Delta representative tells me that there are full–time Delta inspectors on the assembly lines all the time; that's why the quality appears much the same as on my domestic Delta machines, and I doubt you'll do much better than that!

Setting up the machine could hardly be easier. Part of the credit for this goes to the unnamed authors of Delta's outstanding instruction and parts booklet. When my grinder arrived, I read the manual and then used a 10mm wrench and nut driver to ensure that all assemblies were square; every part on my machine arrived already set for square. The manual said that the grinder must be securely fastened to the bench by the mounting holes; I didn't do this, much preferring to be able to adjust the depth of the water by dumping some out rather than using the drain plug. Even without clamping it down, the tool is perfectly stable. Water depth is another issue where my preference differed from Delta's instructions: The manual wants the wheel to be submerged by about an inch, but I have found that I get better and slightly quicker results when the stone just skims the water, leaving a nice slurry on it. The stone seems to absorb quite a lot of water, so you'll be adding to the reservoir regularly as you work. The 1/5 horsepower motor runs cool and quiet; its ambient temperature can't have risen even ten degrees above room temperature in an hour. Part of the cool operation is caused by the self–lubricating *nylon* differential; so many comparable differentials are metal and clattery! Not only does the grinder stay cool during operation, but the tools being sharpened never get warm, much less hot or burned. Quality is so high that I don't anticipate ever getting a chance to test Delta's two–year warranty on this machine.

The grinding stones are aluminum oxide, and they can be left partially sub-



The Delta Wet/Dry Grinder has a regular 5/8" fast grinding wheel and a 2" wheel that spins submerged in a water basin.



Scangrind makes a 1-1/2" wide wet grinder in both 6" and 8" models. These machines grind faster than the others tested.

photos by the author

merged indefinitely without damage. Most amazing of all the features on these stones is their price when compared to other stones of the "granulated aluminum oxide with vitrified white bond" variety: Delta sells the replacement stones for $5 and $25; I've seen similar stones selling for $24.90, and $40.75, respectively.

The other excellent choices for those who want hollow–ground edges are also imports. These two from Scangrind are made in Denmark (some of the components are Italian). The grinders come in 6" (Model 150) and 8" (Model 200) configurations; in either case, the wheels are 1-1/2" wide. Unlike the Delta grinder, these offer three kinds of wheels: gray (for general use), white (for sharpening knives, etc.), and green (carbide, for very hard metals). Also, unlike the Delta, the Scangrind grinders will run the wheel in either direction. Rotation toward the operator is best for grinding chisels and plane irons, but the reverse is better for grinding knives, axes, and other such blades. No other grinder I know offers this handy feature.

Apart from the radius of the hollow–grind cut by each, the differences between these two Scangrind machines are largely weight, speed, and price. The larger unit runs at about sixty per cent of the speed of the smaller, 120 rpm as opposed to 196 rpm. The small unit weighs 12 pounds and the larger weighs 19. The small unit costs $142.99 and the larger is $173.99. Like the Delta stones, Scangrind stones were developed to operate and stay in the water. It took just over a quart to half–fill the Scangrind's water trough per the directions, submerging the bottom third of the stone; it took nearly another whole quart to replace what the stone "drank." While the instruction manual specifically says it is okay to leave the stones immersed, their replacement cost ($32.29 — $42.35) may suggest that removing the water would be a good idea, especially in cool climates. Of course the wet stones should be protected from freezing.

The Scangrind grinders are the model of simplicity in design and operation. Maintenance consists only of annually adding a few drops of oil to the otherwise self–lubricating wheel bearings. The Scangrind appears to be faster than either the Makita or the Delta; it took less than three minutes with the gray "standard" stone to grind a very satisfactory edge on a 1-1/2" chisel that started out in desperate need of attention. Using the amount of water that the manufacturer's directions suggest caused the machine to splash around more than I really like, but I decided not to remove any when I saw the quality and speed of the results I was getting. A question still lingers in my mind about the safety of using this electrical grinder around all that water, especially considering the puny lamp cord that carries the current. I will certainly work cautiously, mopping as I go.

If I've learned anything, though, it's that none of these systems will put an edge back on a chisel or a plane iron as fast as *I* seem to be able to wear one off. **PW**

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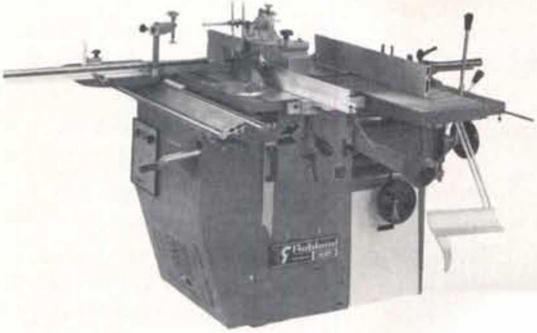

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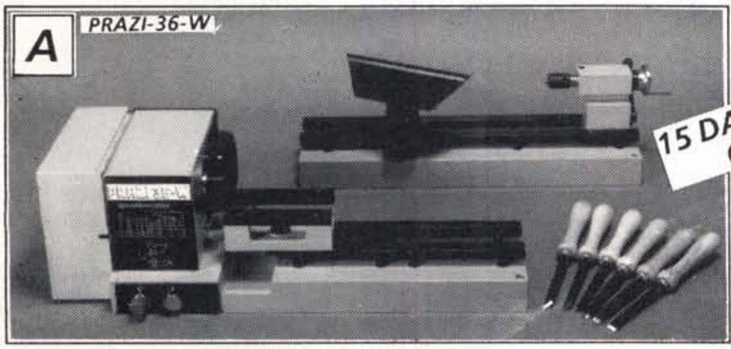

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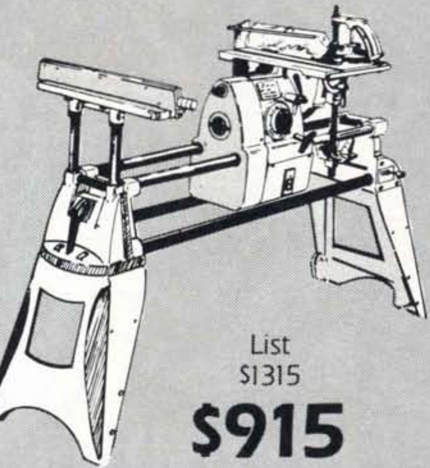

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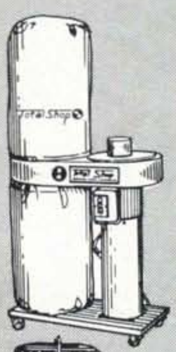

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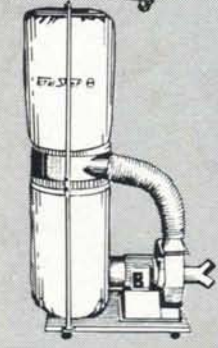

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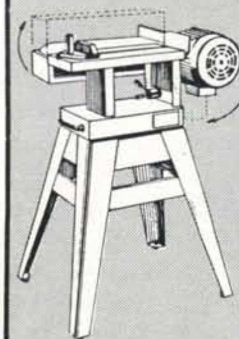

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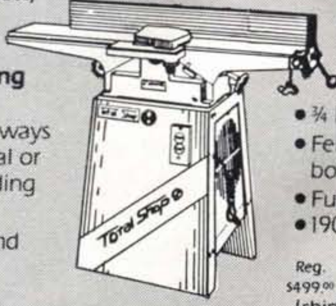

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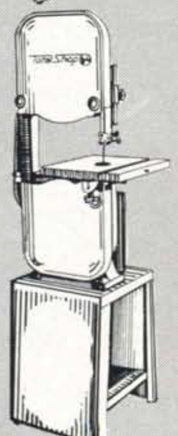

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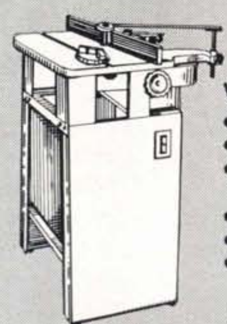

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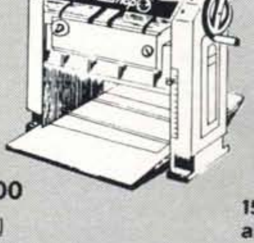

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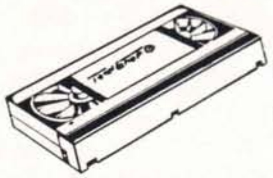

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The Tremont Nail Co

Doing It The Old Way

photo by the author

by Robert Chadbourne

Most manufacturers today make great efforts to stay in touch with trends, relying on market research to keep them informed of what to make, how to make it, and who to sell it to. In view of this, it seems particularly astounding to find a company that has survived making the same product, without change, for 170 years.

The Tremont Nail Company of Massachusetts was founded in 1819, shortly after an invention by Ezekiel Reed appeared that would radically change the most basic item used in construction and woodworking of all types—the nail. To begin, however, we should go back a bit with a little of the history of this simple device.

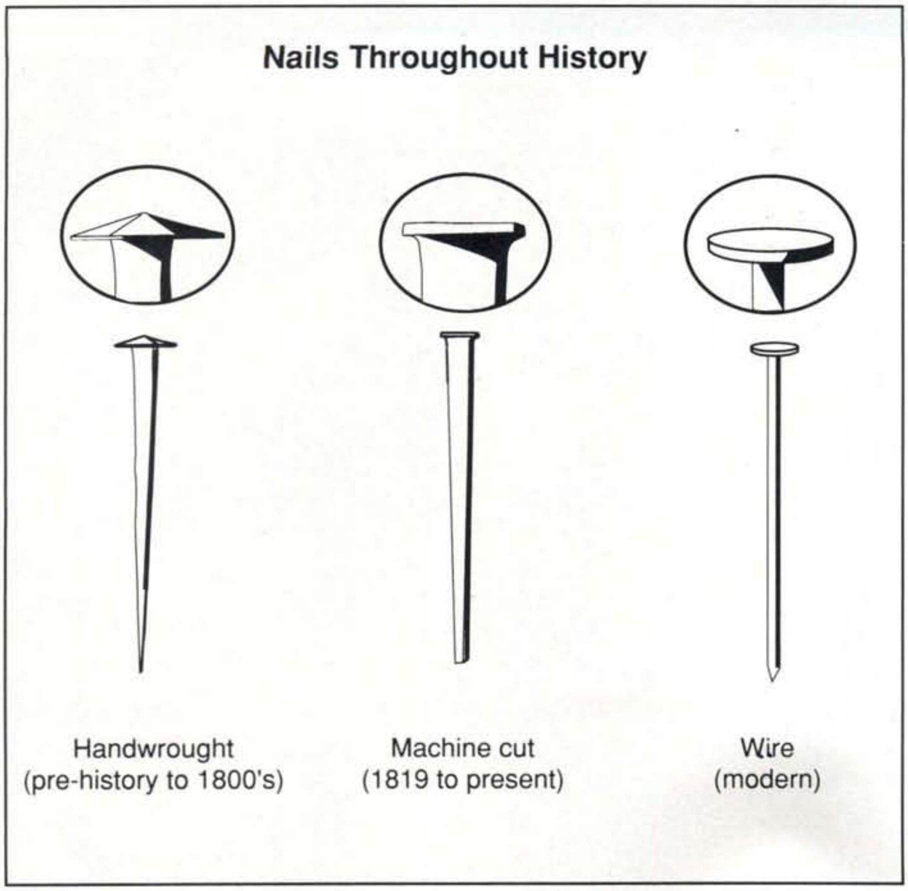
The use of nails dates back to examples from the Roman Empire, and there are existing artifacts recovered from sunken ships and excavations that can be traced to about 500 B.C. These nails were of the type known as "handwrought," and this type was to be used for the next 1800 years or so. They were made in a variety of styles, varying according to their intended use (on ships, buildings, barrels, etc.). Handwrought nails were made individually, and the head was hammered into shape as shown.

In the 1700's, settlers in Massachusetts found iron ore in the ground and began to smelt the metal and forge nails to build the Massachusetts Bay Colony. A skilled "nailer" in those days could hand-forge 1000 nails a day, and nailmaking became a cottage industry for Revolutionary Era farm families during the winter. With the Industrial Revolution in the late 18th and early 19th centuries came sheets of steel and machinery as well as a demand for more and more nails, and in 1819, the invention of the nail–cutting machine by Ezekiel Reed. Now nails could be stamped out of sheets of metal (though the heads were still shaped by hand), making production much faster and large quantities available more cheaply. Shortly after this, machines came along that could make the heads, too. For the rest of the world, further innovations followed leading to today's wire nails which are made in a variety of shapes and kinds. For Tremont, though, this was to be the last innovation, and the company has made "cut" (or "square") nails the same way ever since.

The company, nestled among the old weather-beaten homes of Cape Cod, sells nails throughout this country and others for use in boatbuilding, in traditional restorations and antique reproductions. However, cut nails are not only used for authenticity. Tremont reports that most of its nails are used to attach wood to concrete. Since they're cut from one piece there is less hazard of the head coming off, and cut nails will penetrate hard substances more easily than wire nails. Proponents also claim that cut nails hold better; the square, rough edges dig into the wood and hold on. They also go into the wood more cleanly, with less chipping at the point of entry.

The look of the Tremont Nail Co. has changed slowly, when at all, in its long history. The newest building, built in the 1940's, is still called "the new building" by workers I spoke to, including Ted Roy who began at the company 54 years ago.

***Robert Chadbourne** is a freelance writer and media specialist in East Longmeadow, Massachusetts.*

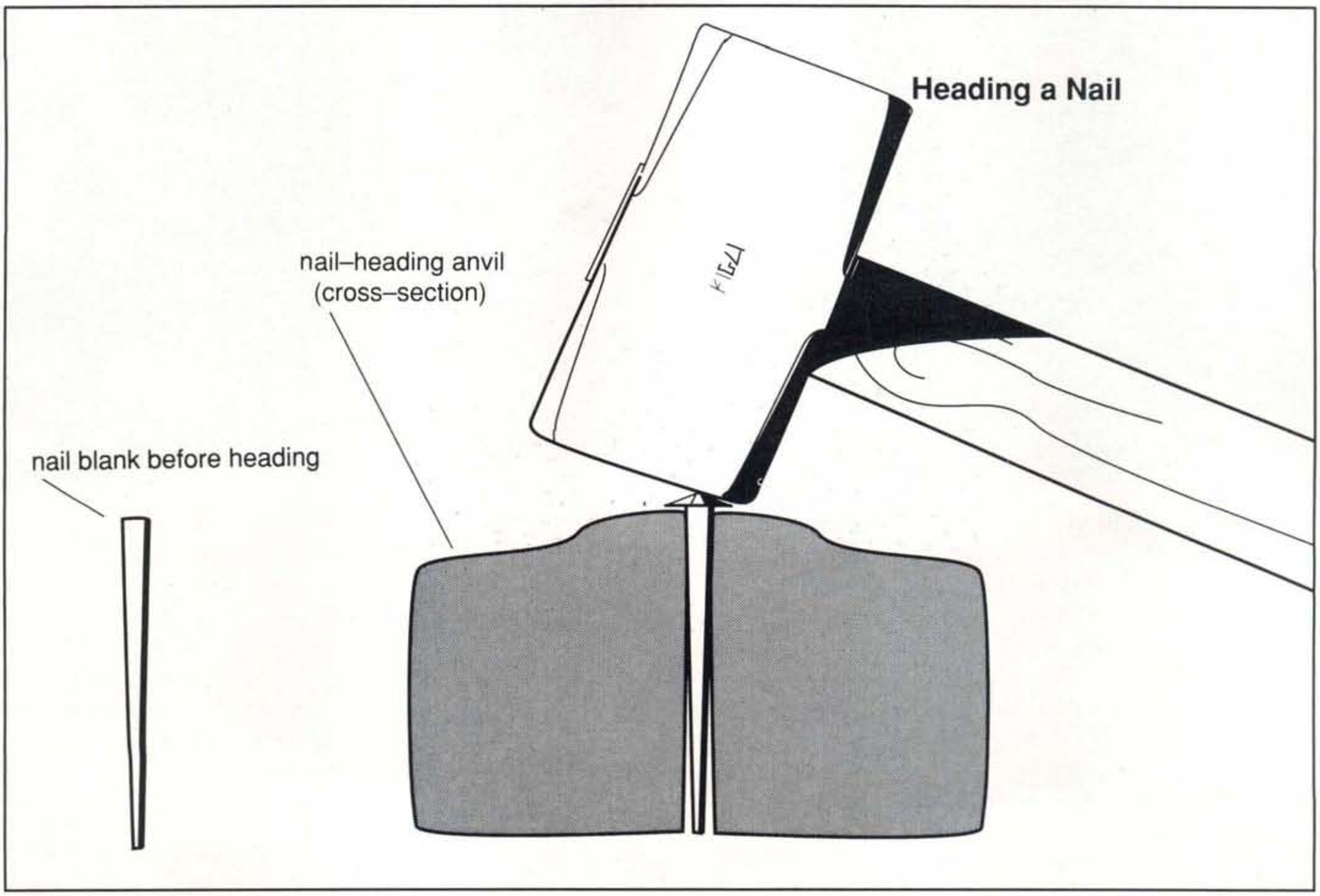


Nails Throughout History

illustrations by Jeffrey Burr

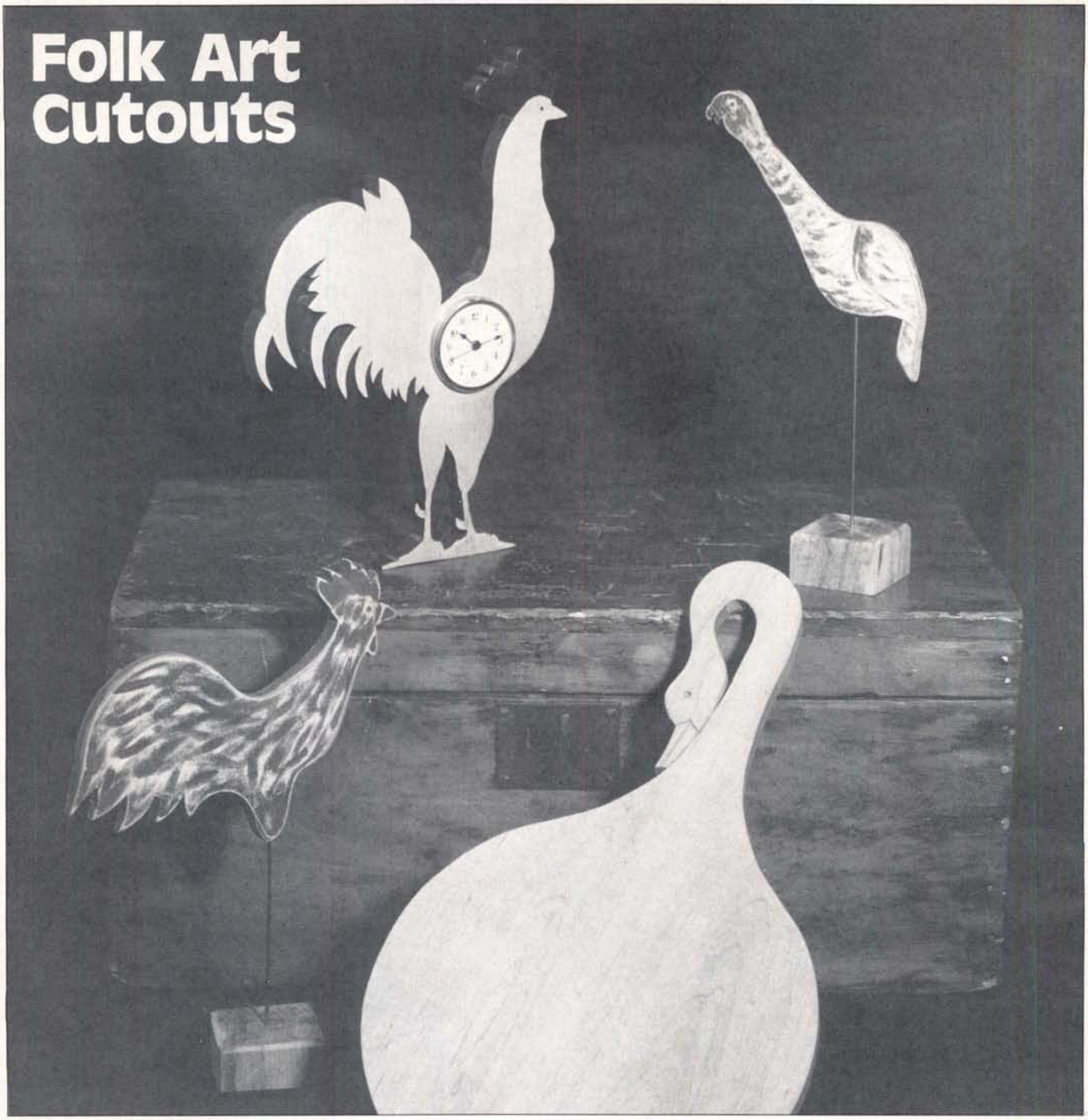
"This place looked old the first day I worked here," said Roy, a machinist whose son and grandson now also work at the plant. His skills are essential for the company; the nail-cutting machines range in age from 85-140 years old. Breakage of one of their parts means that a machinist must make a new one—on the spot—from the still–existing wood patterns, or salvage a part from the scrapheap outside known as "the graveyard." The 71–year–old Roy, when asked when he might retire answers, "When I'm old enough."

Tremont has practically had the corner on the cut nail market for years. There is only one other manufacturer in the U.S. that makes cut nails anymore, and they make far fewer than Tremont. Recently, however, South Korea has entered the market and is underselling Tremont. This, along with developments in construction such as electric nailers which can fire wire nails into concrete, causes some concern about the future. For now, though, you can still get cut nails from Tremont Nail Co. just as they made them 170 years ago.



Heading a Nail

Folk Art Cutouts



by John A. Nelson

Folk art is defined as art by the common people for the pleasure of the common people. It is often decorated with designs based on familiar and sentimental themes.

Folk art is usually made by relatively unskilled people. These things tend to grow on you. I have made copies of rather old folk art projects and have given them to my wife and two married daughters. At first they accepted them with some apprehension, but now they look forward to receiving them (I think they do, anyway). They used to place them in out–of–the way places in their homes where no one would normally visit, but now I find them proudly displayed in their front windows or some other prominent place.

These projects are whimsical and fun to build. They give you a chance to really relax and not have to worry about perfect fits, shapes or finishes.

I usually try to make mine look old by sanding the edges and staining over the paint with a light walnut stain color.

Folk art projects make wonderful gifts and are great projects for craft fairs. I have been amazed by how they are accepted and by the prices you can ask (and actually get) for them.

In the PullOut™ Plan section at the center of the magazine are full–size patterns for four simple folk art projects: Rooster–On–A–Stick, Turkey–On–A–Stick, a Swan Cutting Board and a

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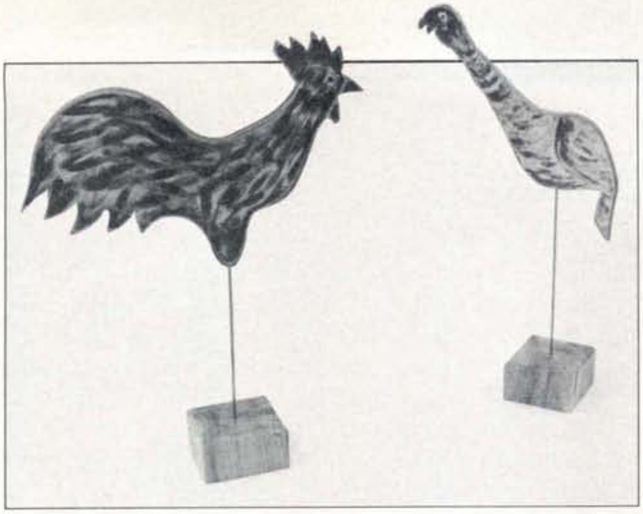
***John A. Nelson** is the author of numerous books on woodworking and a contributing editor for* Popular Woodworking.



Rooster Wall Clock. Remember, nothing is sacred; let yourself go on these. With folk art projects you do not have to be exact.

Fowl–On–A–Stick

These two projects are excellent examples of folk art. Those of you who make things to sell at craft fairs, don't pass these over. They take almost no material and very little time to make. They can be made from scrap wood you have laying around your shop (hardwood is best). Believe it or not, in southern New Hampshire these sell very easily for as high as $22.00.

If you plan to make several of each, copy the pattern from the PullOut™ Plans onto a piece of heavy cardboard so you'll have a sturdy pattern to trace around.

Use a sabre saw or a band saw to cut them out. I usually tack together four pieces and cut them all out at once on my band saw. Sand the sides and edges, rounding the edges slightly.

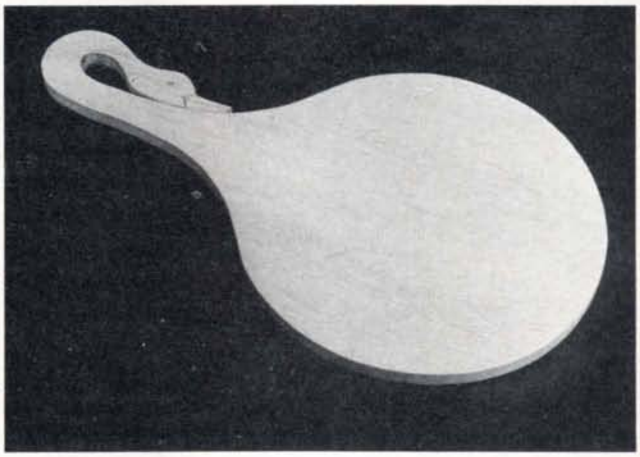
Cut the base from any hardwood you have around. The size isn't too important, but you will need the heft of hardwood; you wouldn't want your bird to fall over, would you? Stain the base with most any stain you want to use up.

Paint the body using a flat, off–white color. Let it dry, and add the brick red beak and comb. Paint the rest of the body details any way you wish. Let dry for a day or so, then sand with fine sandpaper. Be sure to sand through the paint at the edges and sand away some of the side details to simulate years of wear. Using a light walnut stain, paint over the entire body and wipe it off immediately. This will give your bird an antique effect.

A 9" long piece of welding rod makes an excellent post for your bird. Drill a 3/32" diameter hole 3/4" deep into the body, at the angle illustrated. This is important so the bird will stand properly. Drill the same size hole into the center of the base. You could use a piece of 1/4" dowel in place of the welding rod; if you do, take care when drilling the hole in the center of the body.

Swan Cutting Board

Cutting boards come in all shapes and sizes. I saw one similar to this one at a flea market a year or so ago. The dealer said it was an old design from South Carolina—how she knew this, I do not know. The original was about 1/3 larger than this one—too large for most homes of today.



photos by Deborah Porter

Your cutting board should be made from a hardwood that is knot–free and straight–grained. It would be best to use a single, 12" wide board if at all possible. If you have a planer, you might want to consider gluing up your 1" to 2" wide scrap pieces to obtain the 12" wide piece. If you glue up material, use a waterproof glue and plane the surfaces smooth.

Bandsaw just outside the line, and later sand down to the line. Sand all over, progressively from medium paper to extra fine.

Using a sharp carving knife, detail the beak and neck as shown. Finish up with #0000 steel wool.

Use a salad bowl finish on your board. Be sure not to use a toxic finish.

Rooster Wall Clock

This project makes a great kitchen clock. The pattern is taken from an original, antique weather vane from Massachusetts, but is scaled down to make this clock.

It would be best to use a single, 10-1/2" wide board if at all possible. I glued two pieces together to make this one. Again, you might want to consider gluing up your 1" to 2" wide scrap pieces to obtain the 10-1/2" wide piece.

Cut out the rooster from the pattern in the PullOut™ Plans section. Locate the center of the clock face and cut out a 2-5/16" dia. hole for Klockit movement #15022-A (Klockit, P.O. Box 629, Lake Geneva, WI 53147, 1-(800)-KLOCKIT).

If you use some other clock movement, be sure to have it on hand before cutting the hole and adjust the hole size accordingly.

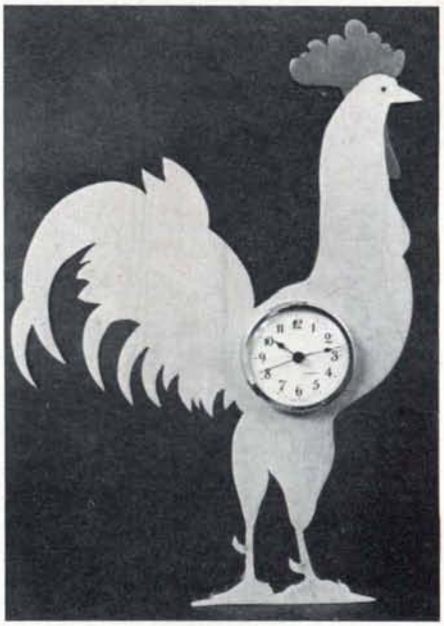
Add a brass hanger in the approximate location where the rooster will balance level when hung. Check this with the movement in place before finishing.

Remove the movement before starting the finishing process.

Paint the rooster's cone and beak bright red.

When the red paint dries, apply two or three coats of a high–gloss varnish or shellac, lightly sanding between coats.

Add the movement and hang your clock. PW



A Popular Woodworking Project

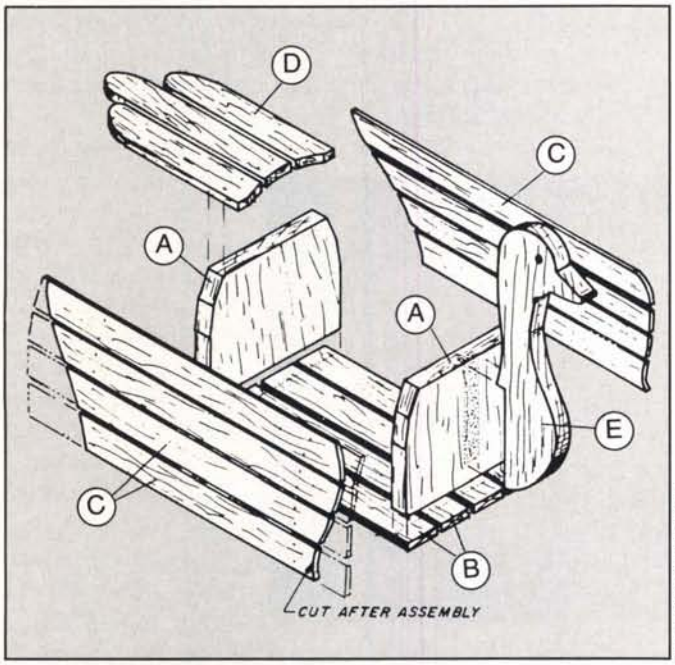
A Duck Basket

by John A. Nelson

Baskets come in all shapes and sizes; here is yet another to consider. In New England this kind of basket is very popular. It is simple to make and is a "natural" for mass production.

Study the drawings to be sure you understand how the duck will be assembled. Read all instructions before starting as there are a couple of tricks that make the job easier.

Make patterns for the tail feathers and the head from the PullOut™ Plans in the center of this magazine.



Cut the ends (A) to size and make the cuts to "round" them.

Rip the 3/8" stock for the slats from the edge of two–by material, and cut them to the lengths suggested for the bottom boards (B), side boards (C), and tail feathers (D).

Cut the tail feathers out following the pattern, but leave the side boards long until after assembly. While you're at the band saw, cut out the head. Drill a hole for the duck's eye.

Nail and glue the four bottom boards (B) to the ends (A), taking care to evenly space the boards as shown in the front view in the plan. Attach the side boards with a strong 2" overhang at the front end and extending a good 3" past the back end piece as shown in the side view. Be sure to space them as shown.

Mark the approximate shape of the sides and cut the profile on a band saw after the sides have been glued and nailed in place. Hold the assembly on its side and cut both sides at the same time so their profiles will be the same.

Add the tail feathers (D) to the top of the back end piece. Be sure to leave spaces between feathers.

Sand and stain the basket and paint the head black.

Locate and glue the head in place. You might wish to drive a screw into it from inside the basket.

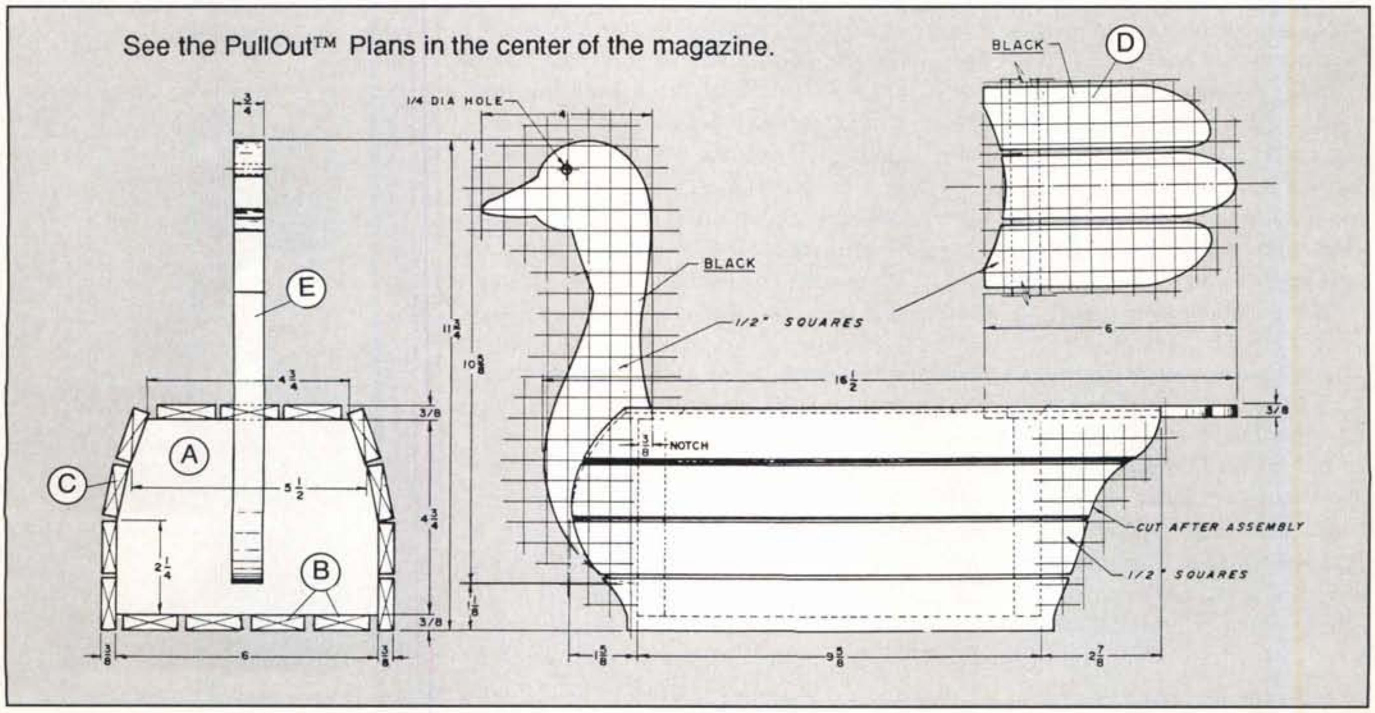
Apply a top coat of waterproof varnish over the entire duck. Using #0000 steel wool, rub down the varnish and then apply a coat of paste wax.

Your duck is now ready for a plant or whatever else a duck basket holds. **PW**

Illustrations by the author

***John A. Nelson** is a woodworker and drafting instructor from Peterborough, New Hampshire, and the author of 21 books on various subjects, including* Colonial Classics You Can Build Today *(Stackpole Books, Cameron and Keller Streets, P.O. Box 1831, Harrisburg, PA 17109).*

See the PullOut™ Plans in the center of the magazine.

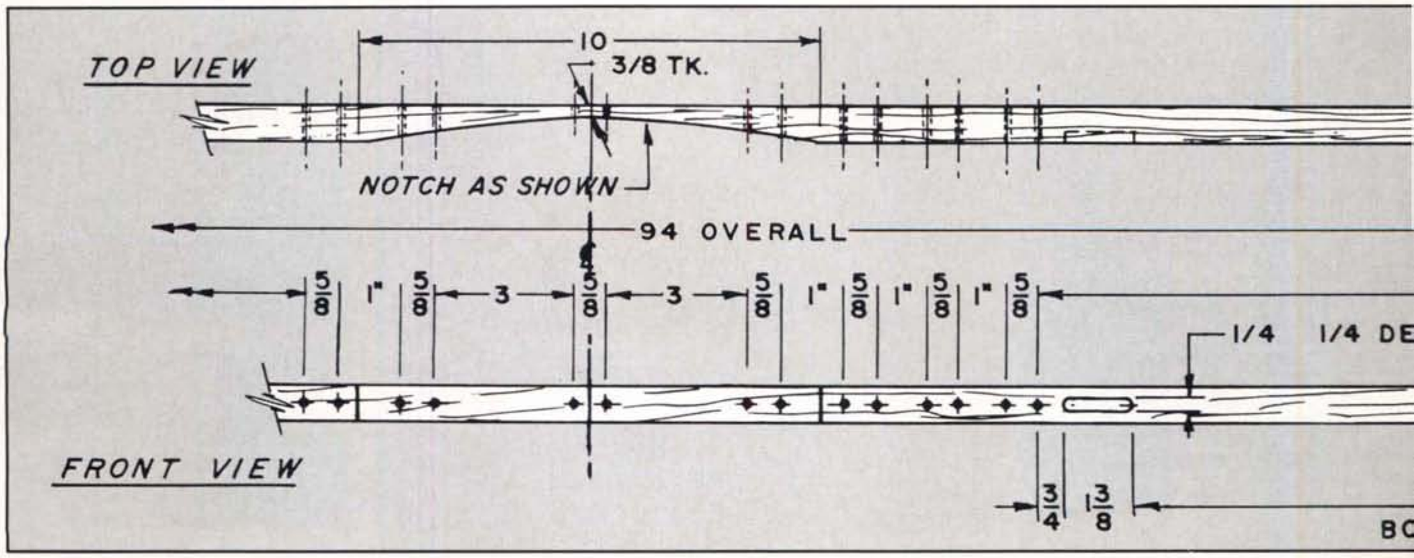


Deborah Porter

A Popular Woodworking Project

Making Snowshoes

Deborah Porter



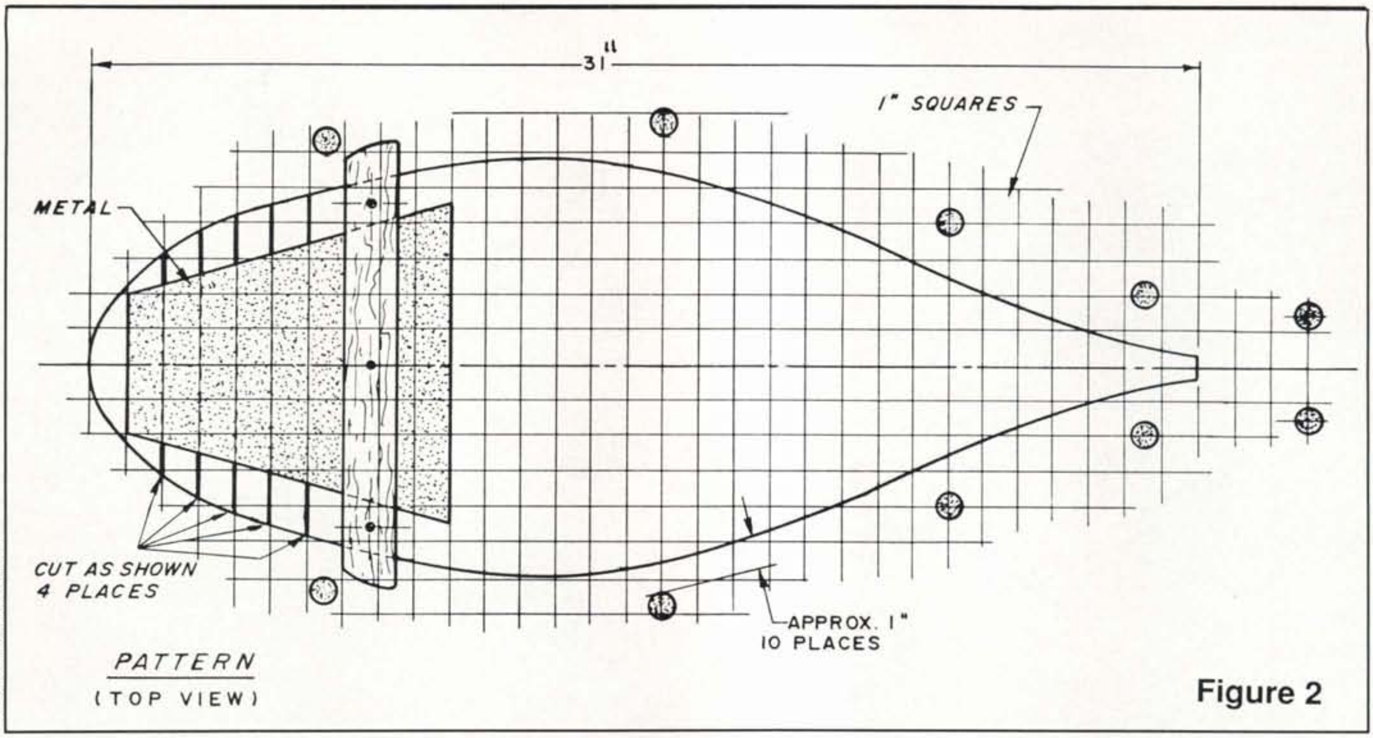


Figure 2

Illustrations by John Nelson

by Steve Erdody

Growing up in rural New England, where hard winters with an abundance of snow are the rule rather than the exception, it was not unusual to awaken to a foot or two of freshly fallen powder blanketing the countryside. On days like these, my brothers and I would strap on our snowshoes and head for the hills.

Today, I still use the same snowshoes that I had as a kid, and I also have a pair of new-fangled plastic ones (that work quite well). However, my old shoes have just about had it, and the plastic pair just are not nostalgic enough for a Yankee like myself.

I couldn't afford a new pair, so I decided to try to make my own. After a few minor setbacks and adjustments, I was finally able to come up with a high-quality, home-crafted pair of snowshoes.

The first step in making snowshoes is the selection of the proper wood for the frame. White ash is the wood of preference for making snowshoes, but almost any type of ash will work reasonably well. The **bolts** (frame stock) for the snowshoe can be progressively split from the log and then hand planed to finish size, or cut out of stock purchased at the sawmill or lumber yard. In order to make these snowshoes, the ash needs to be at least 94" long. Pick through the ash to find pieces with tight, straight grain running parallel to the edge of the lumber. Start with plenty of ash in order to have extra bolts on hand in case some break during bending.

After the wood is selected, cut it to 94" lengths and plane it to 3/4" thickness. Next, hand plane both edges of the stock until they run as parallel to the grain as possible. Then, rip the stock to 3/4" widths, taking strips from each edge.

Proper layout of the holes and mortises

Steve Erdody is a student teacher of industrial arts at Contoocook Valley Regional High School in Peterborough, New Hampshire.

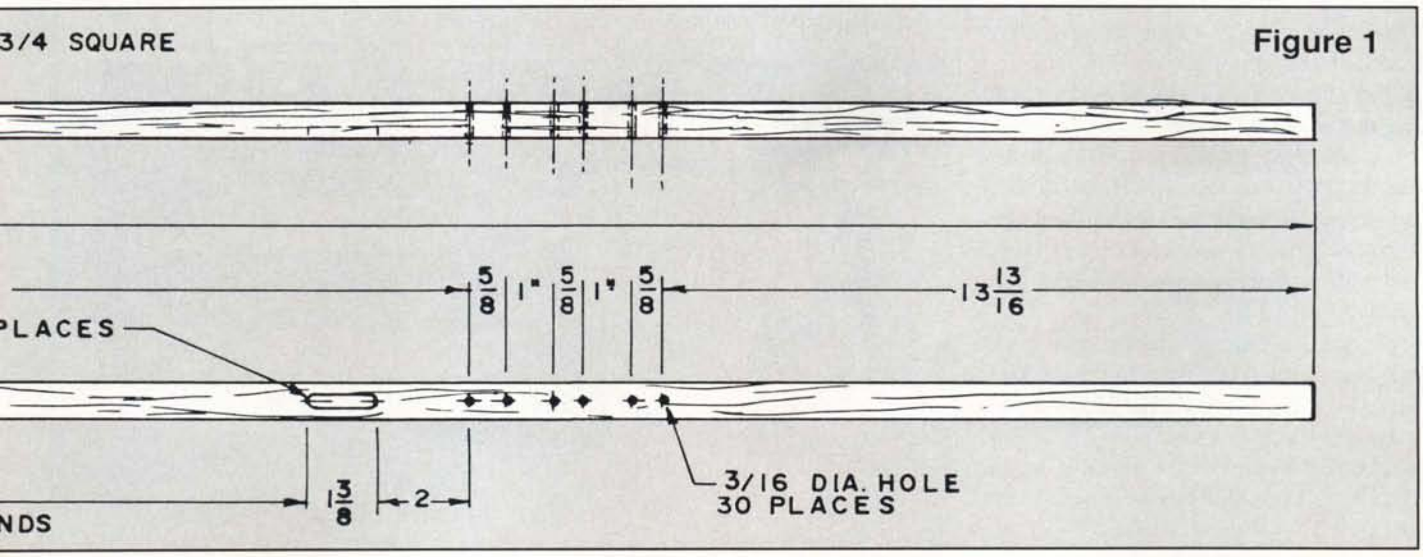


Figure 1

Figure 3

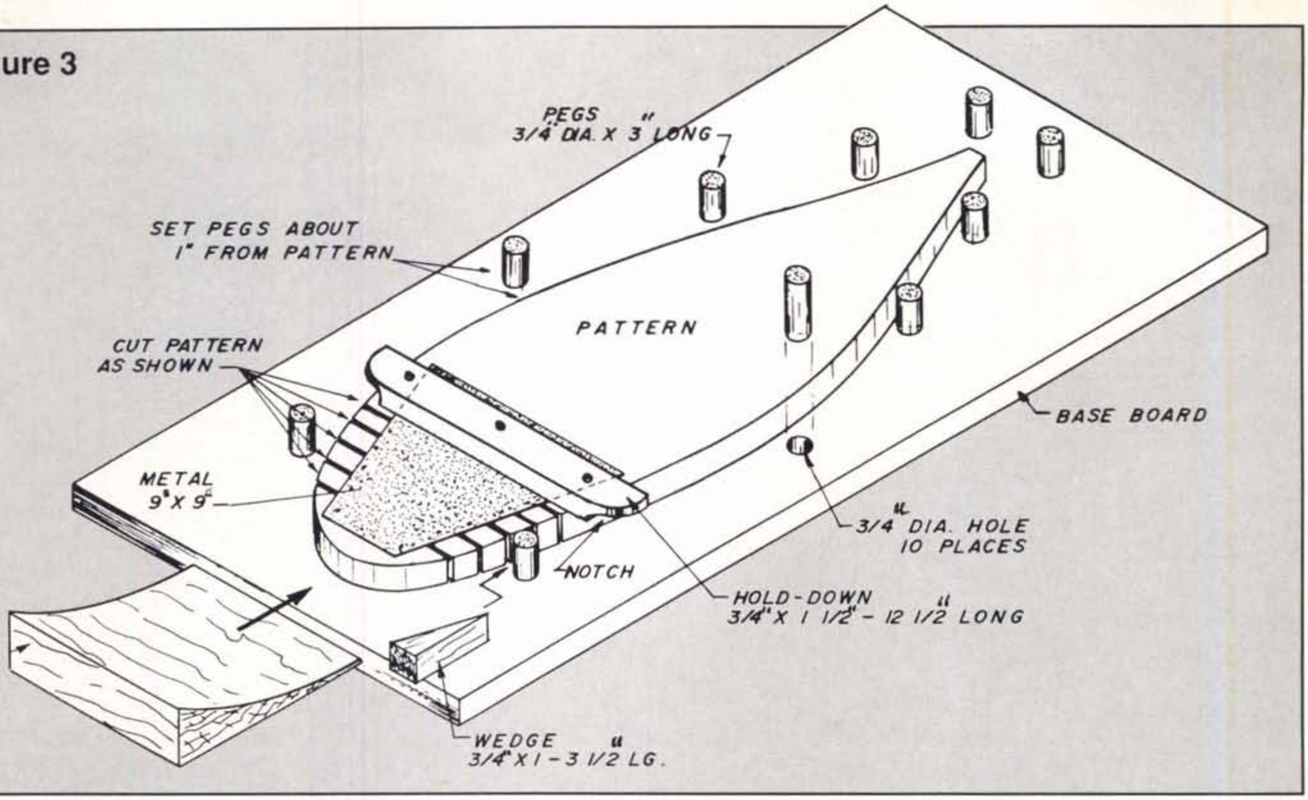


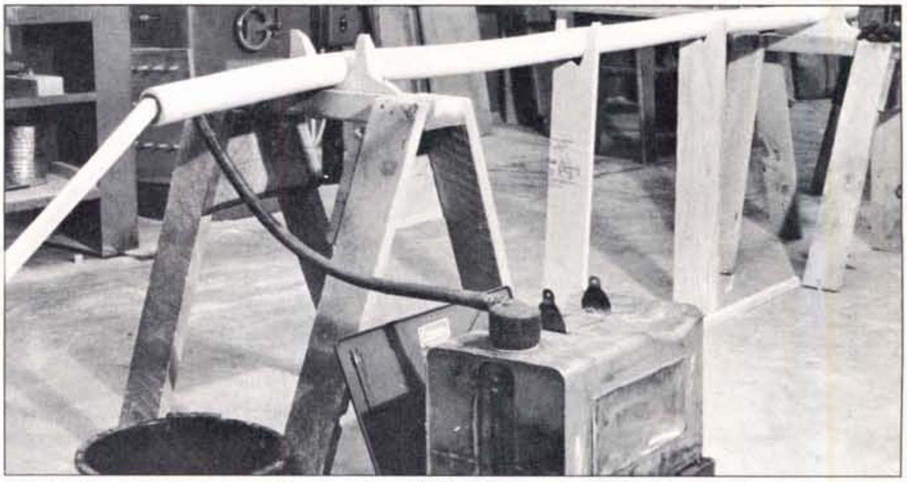
illustration by John Nelson

is very important. Refer to Figure 1 for their location. Lay out a number of bolts at the same time, then cut out the mortises, and spokeshave the toe taper to proper thickness. Do not drill the holes for the lacing until after the frame has been bent.

Making the Form

The pattern illustrated is the traditional and versatile beaver tail style. The best material for the jig is 3/4" plywood or particleboard. Lay out the pattern and cut the shape. Next, cut the dadoes that will allow the toe to bend upward (see Figures 2 and 3). These notches are simply saw kerfs, cut 1" apart, starting 2" from the tip of the toe. Attach a thin piece of sheet metal to the top of the pattern with 1/2" wood screws. This keeps the pattern from breaking when the toe is bent upward. Next, attach the hold–down bar and screw the pattern to the base. Drill the 3/4" holes and cut 3/4" dowel stock into ten 3" pieces, then cut enough wedges for each post and the wide wedge for the toe. The jig is now ready to be used.

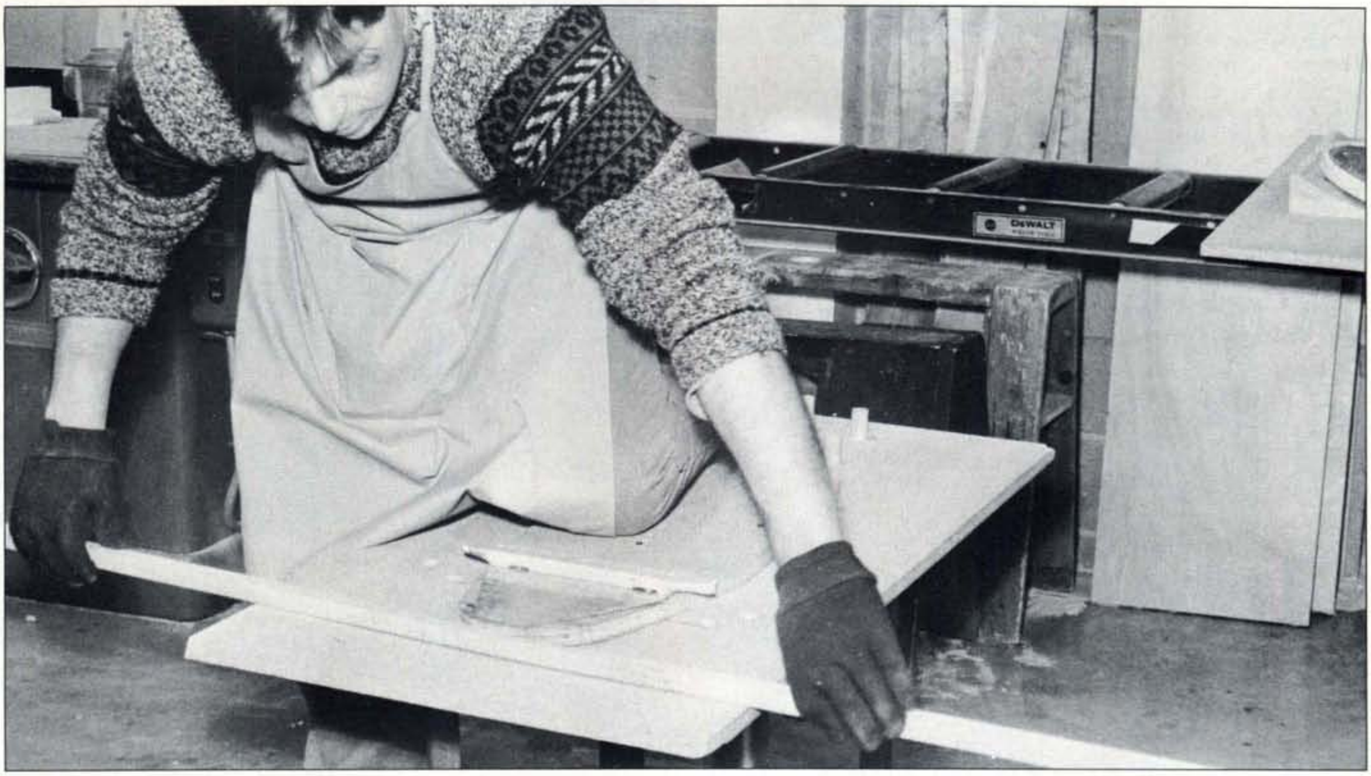
The steam bender can be made in as many different shapes and sizes as there are snowshoe styles. To keep design simple and portable, use a piece of 2", 40-gauge PVC pipe to form the steam chamber. A portable gas stove, such as the ones used in camping, will serve well as a

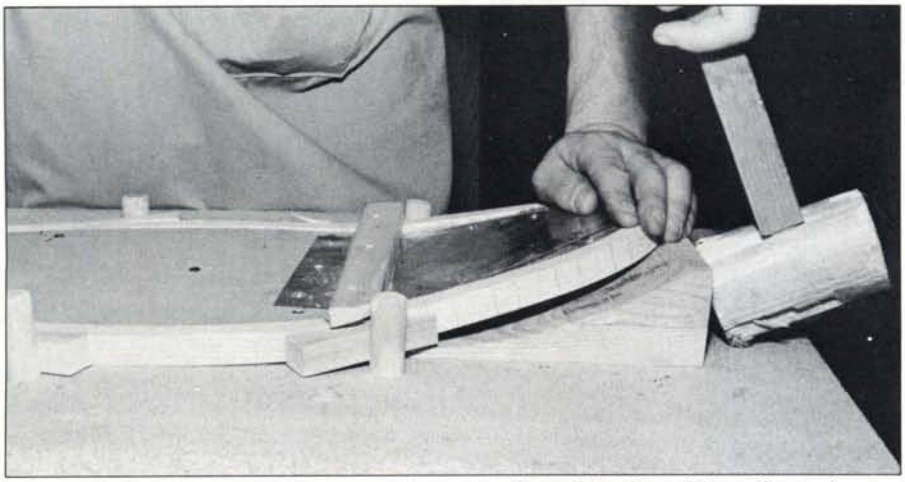


photos by B. William Bigelow

The author's steamer is made of a piece of 2", 40- gauge PVC with a garden hose connecting it to a boiler that is heated by a camping stove.

Wear heavy gloves when working with the hot wood.





The metal plate acts like a hinge across the cut portions of the form. The wedge and additional clamps will curve the toe.

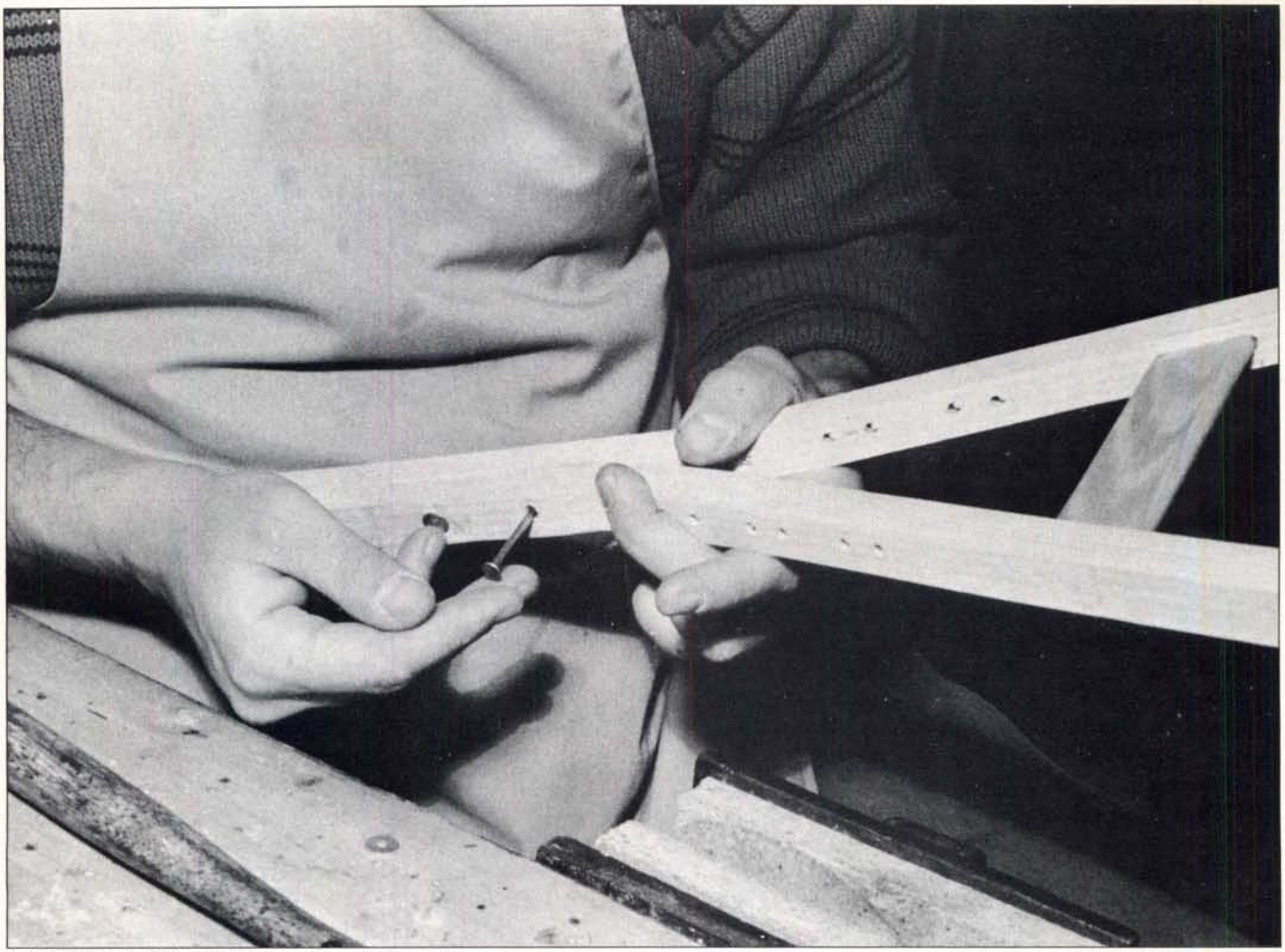
Fitting the crosspiece

heat source, and a large metal container works well as the tank.

To deliver steam to the PVC pipe, connect an opening in the top of the tank to the pipe with a piece of ordinary garden hose (see photo). Be sure to include some type of pressure relief system to the tank, even if it is simply a hole with a cork in it. Close the PVC pipe at the end where the hose enters it. Elevate the other end slightly, and close it with a resealable cap. Drill two 1/4" steam escape holes near the end.

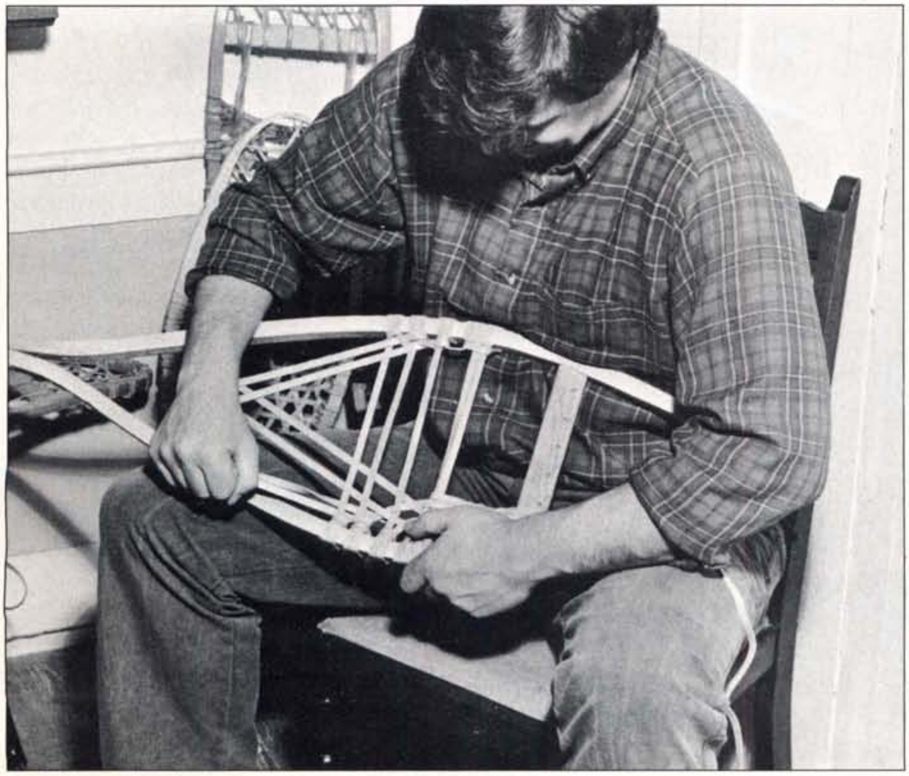
Once the steamer begins pouring out an ample supply of steam, place the bolts in the steamer and allow them to heat for at least two hours.

While the bolts are steaming, ready the jig for bending. When the bolts are removed from the steamer, there is only about one minute in which to bend them. It's a good idea to wear heavy gloves and have an extra set of helping hands there to help with the bending operation. Care must be taken when bending around the toe. This is where breakage is most likely to occur. The chances of breakage can be reduced by clamping a block to the jig to hold the bolt tight against the pattern. Bend the blank around the pattern and insert the dowels and the wedges. Remove the block at the toe and insert the wedge under the toe section. Allow the



1-3/4" rivets hold the frame together at the neck.

Rawhide or neoprine lacing from a kit completes the project.



photos by B. William Bigelow

frame to dry on the jig for one week.

Make the four crossbars from the same stock as the frame. They should be sized to 1/4" thickness by 1-3/8" width; the length is determined by the distance across the frame. After the crossbars are cut, set them in place and rivet the frame together. Then drill the holes for the lacing using a 3/16" drill bit.

The lacing of the snowshoe is an art in itself and would take as much time to explain as the making of the snowshoe. I recommend using a kit ordered from the Stowe Canoe and Snowshoe Co., P.O. Box 207, Stowe, VT 05672, phone (802) 253-7398. The kit can be ordered in either neoprine or rawhide and includes complete instructions for the lacing process. Once laced, give the snowshoe a thorough coat of urethane to protect the wood and the lacing.

Making your own snowshoes can be an extremely satisfying project that will provide you with years of winter enjoyment when finished. PW

PullOut™ Plans

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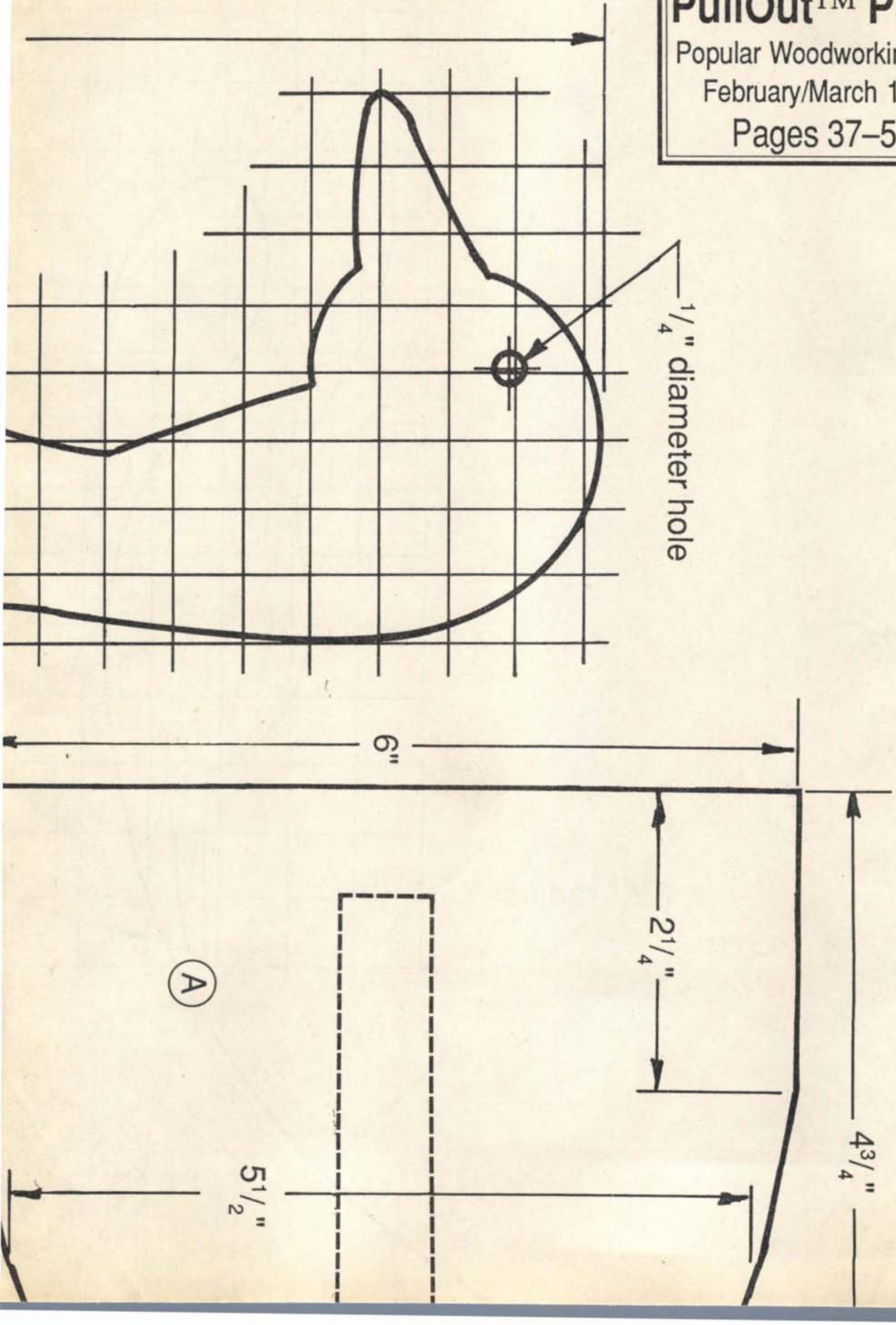
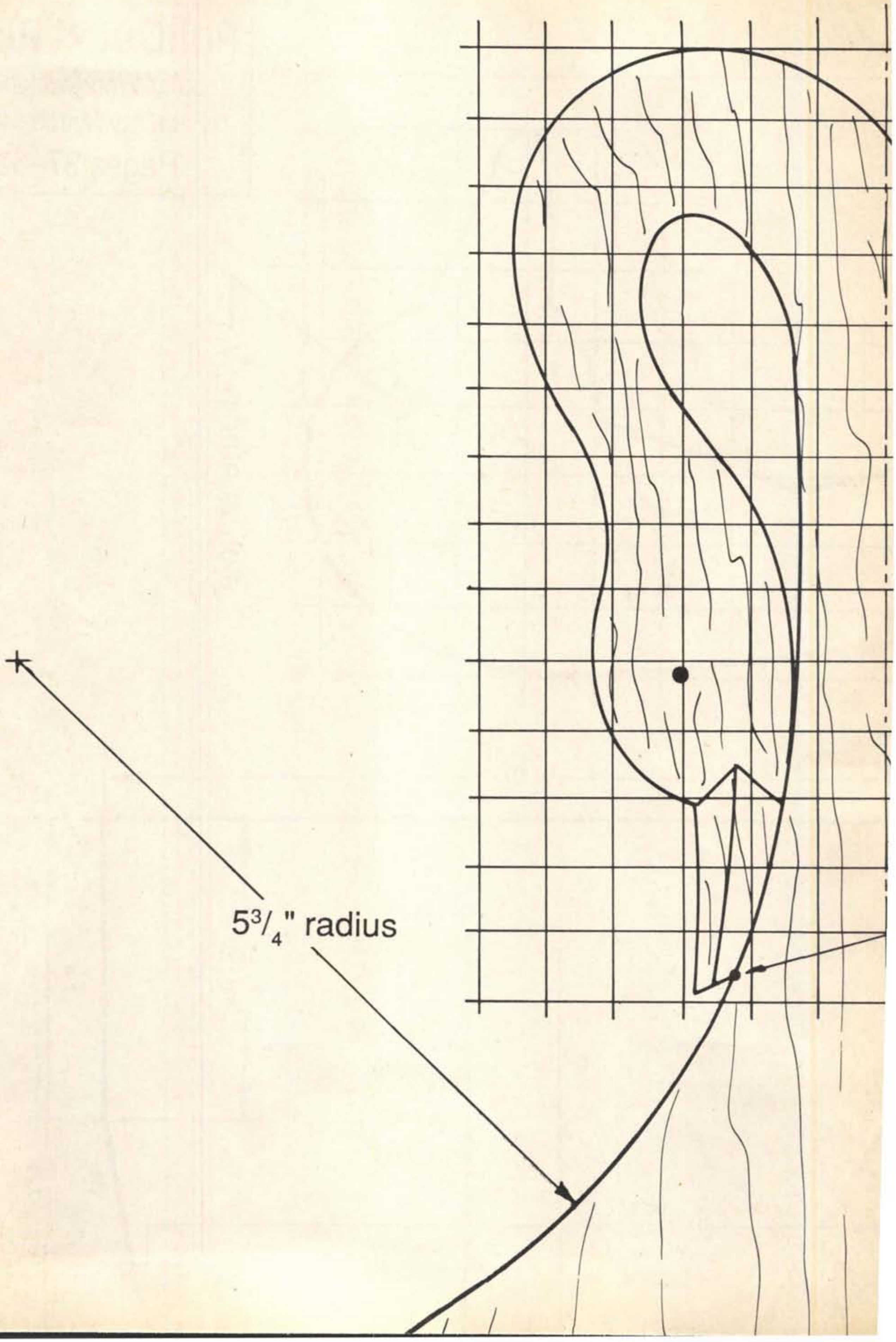
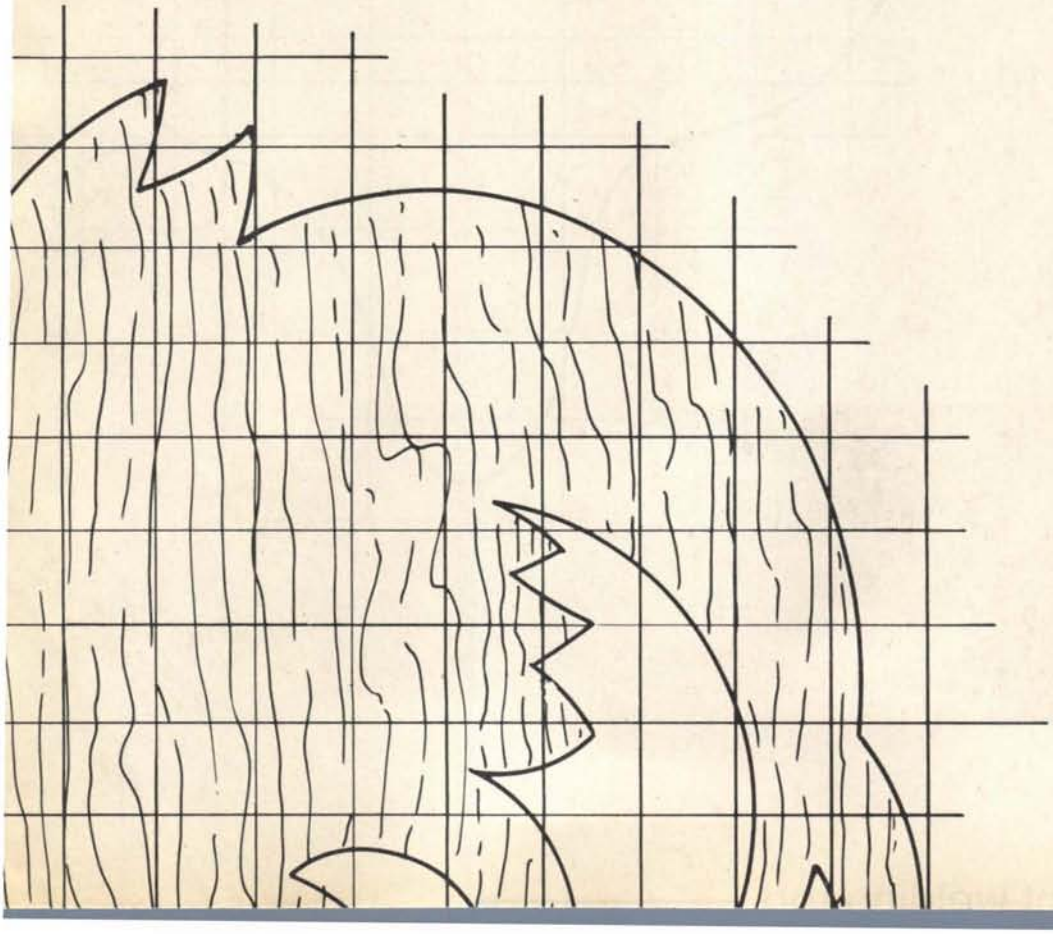
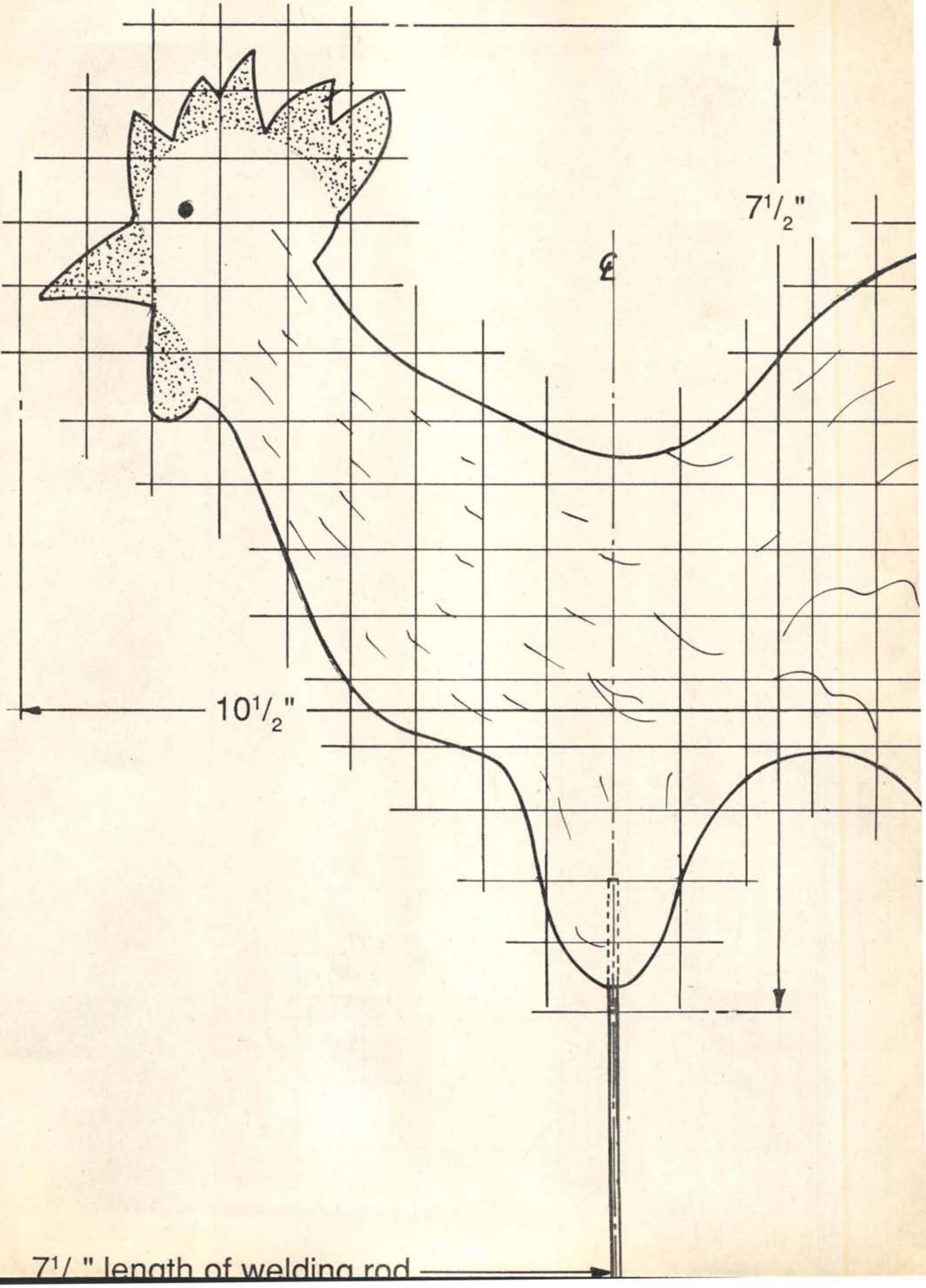
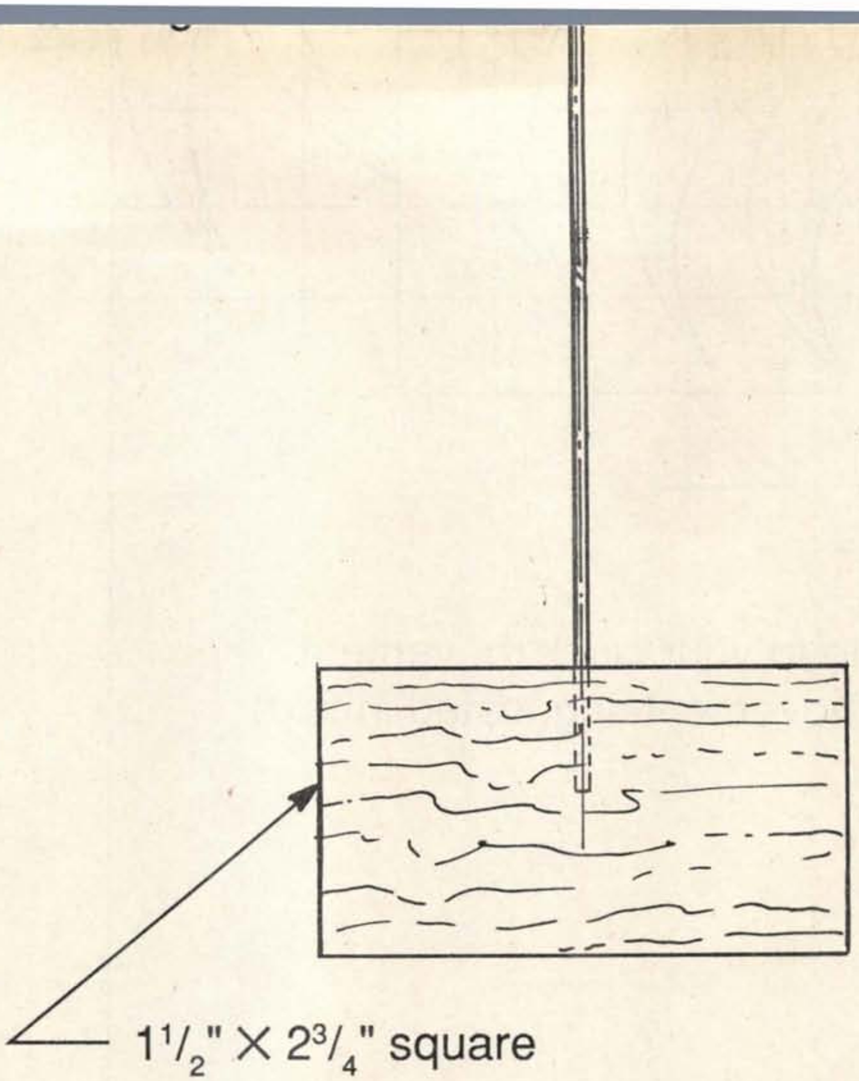
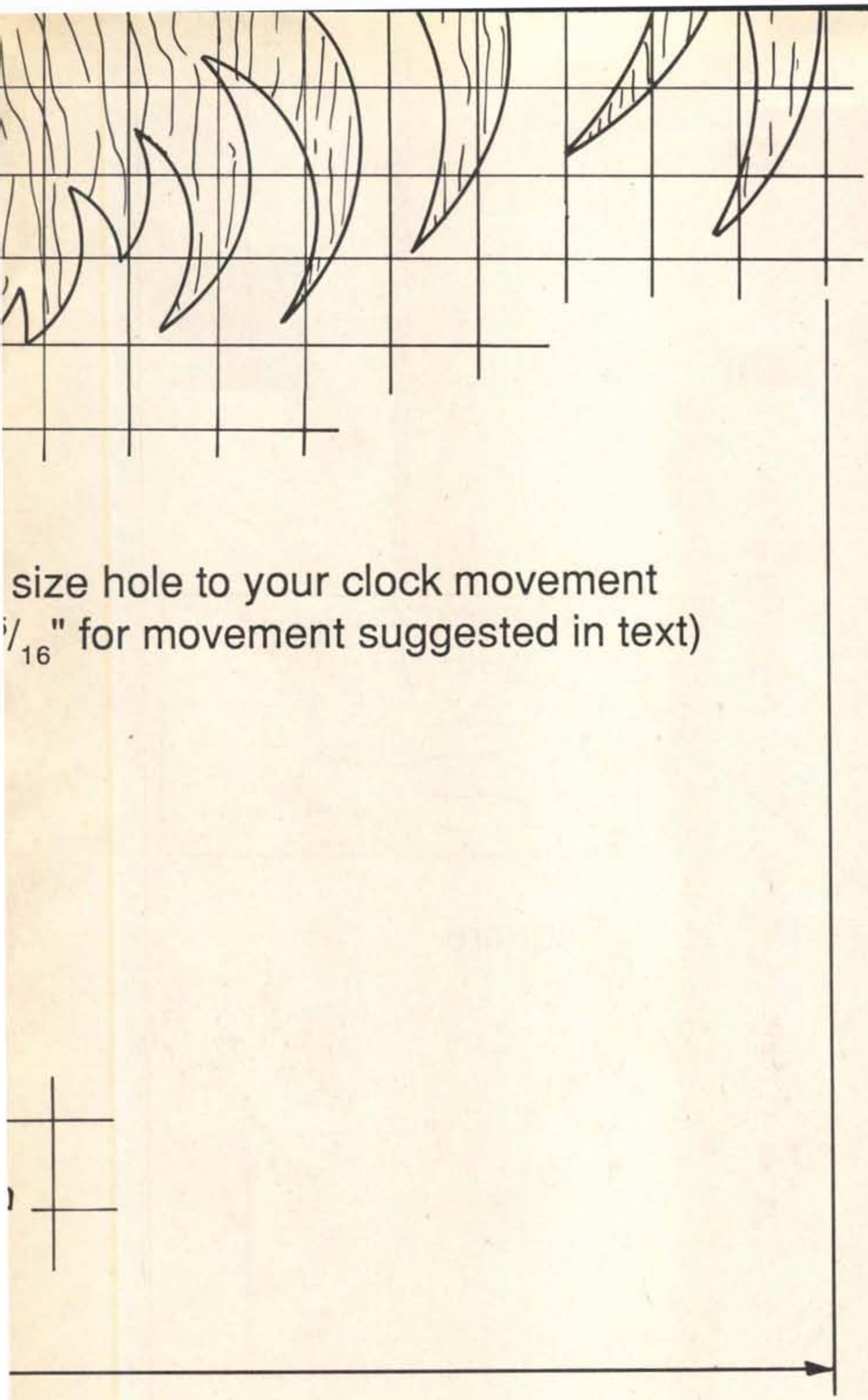


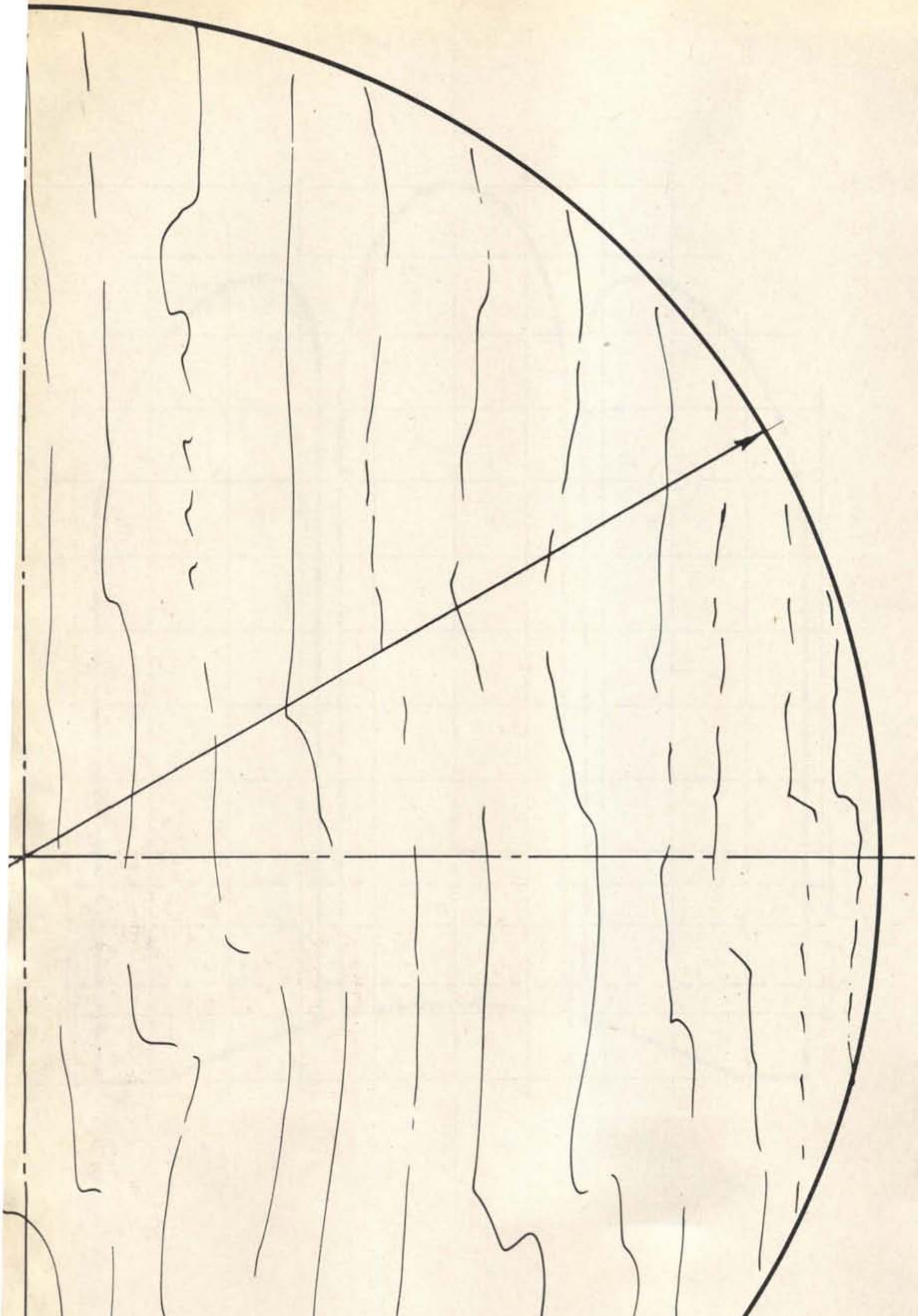

5$^{3}/_{4}$" radius




$7^1/_2$"
℄
$10^1/_2$"
$7^1/$ " length of welding rod


1$^1/_2$" X 2$^3/_4$" square


size hole to your clock movement
/16" for movement suggested in text)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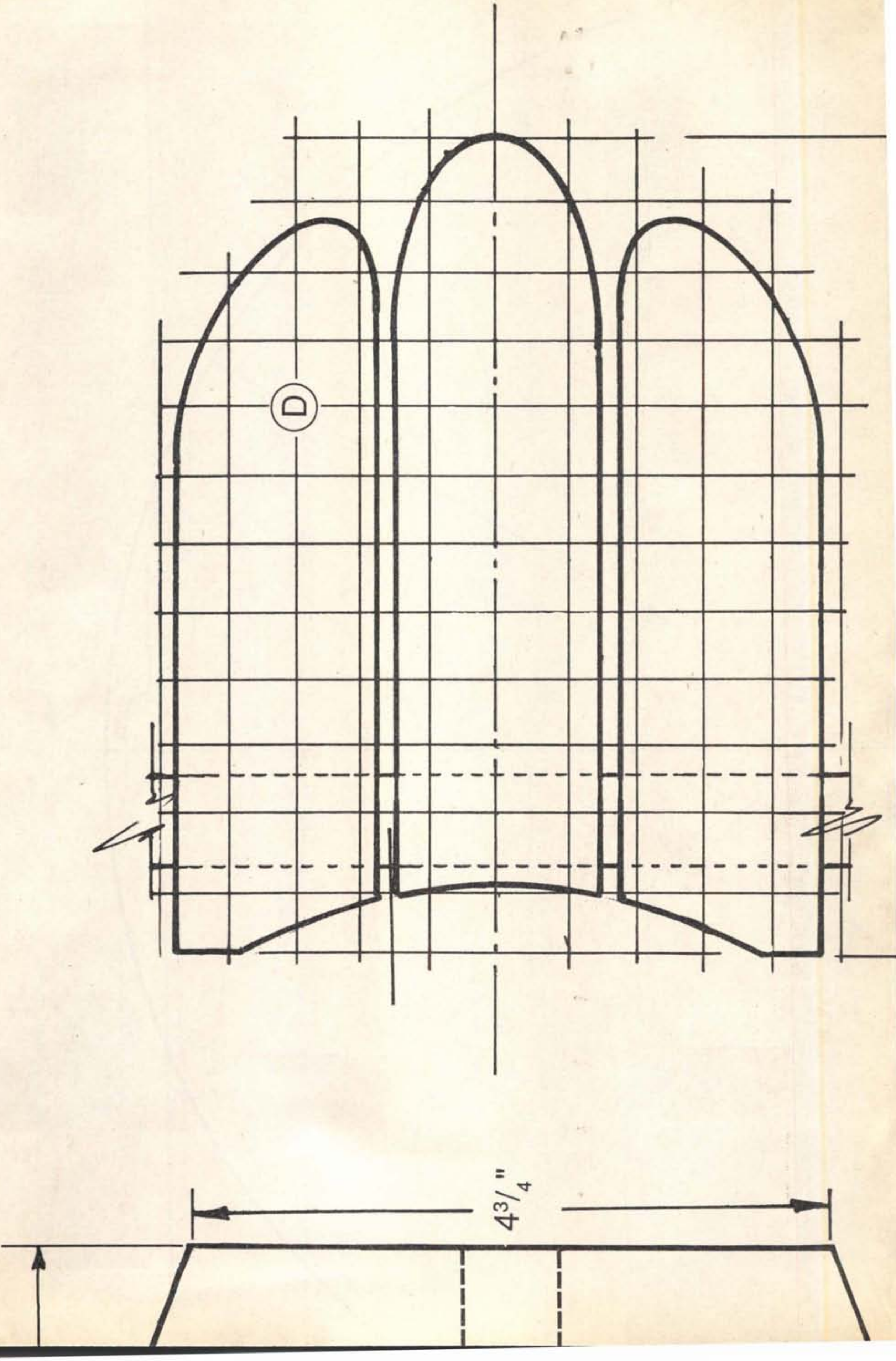
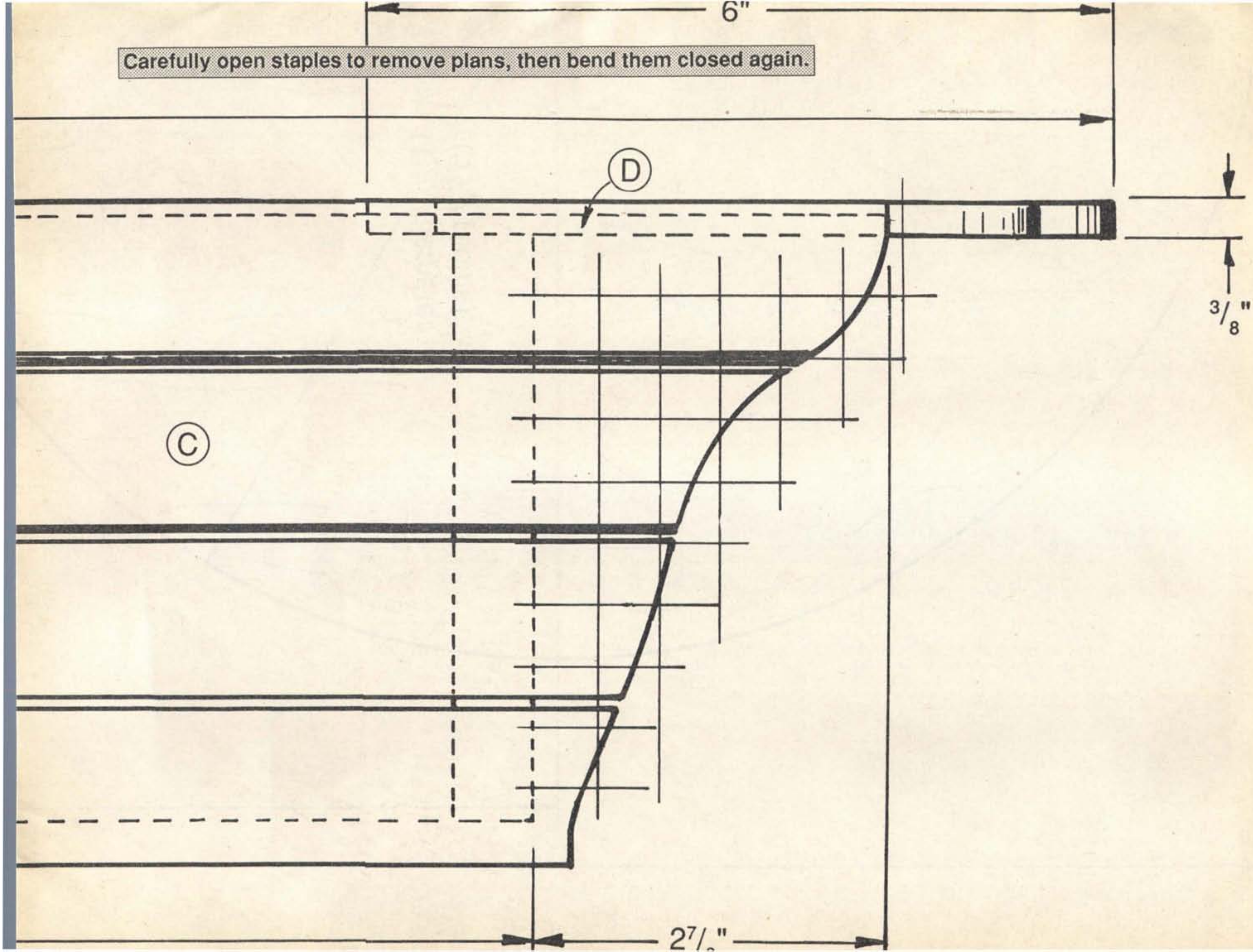
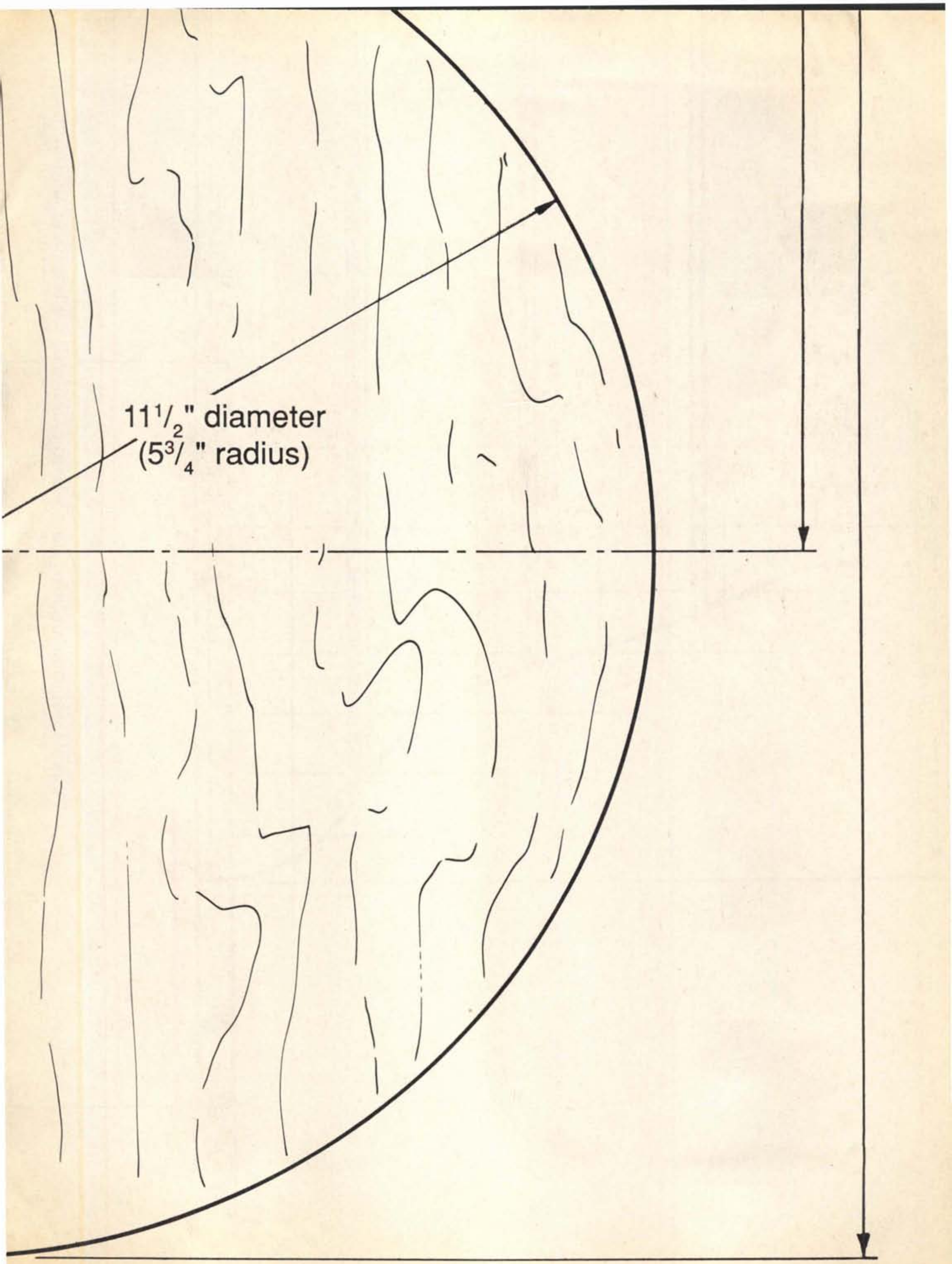
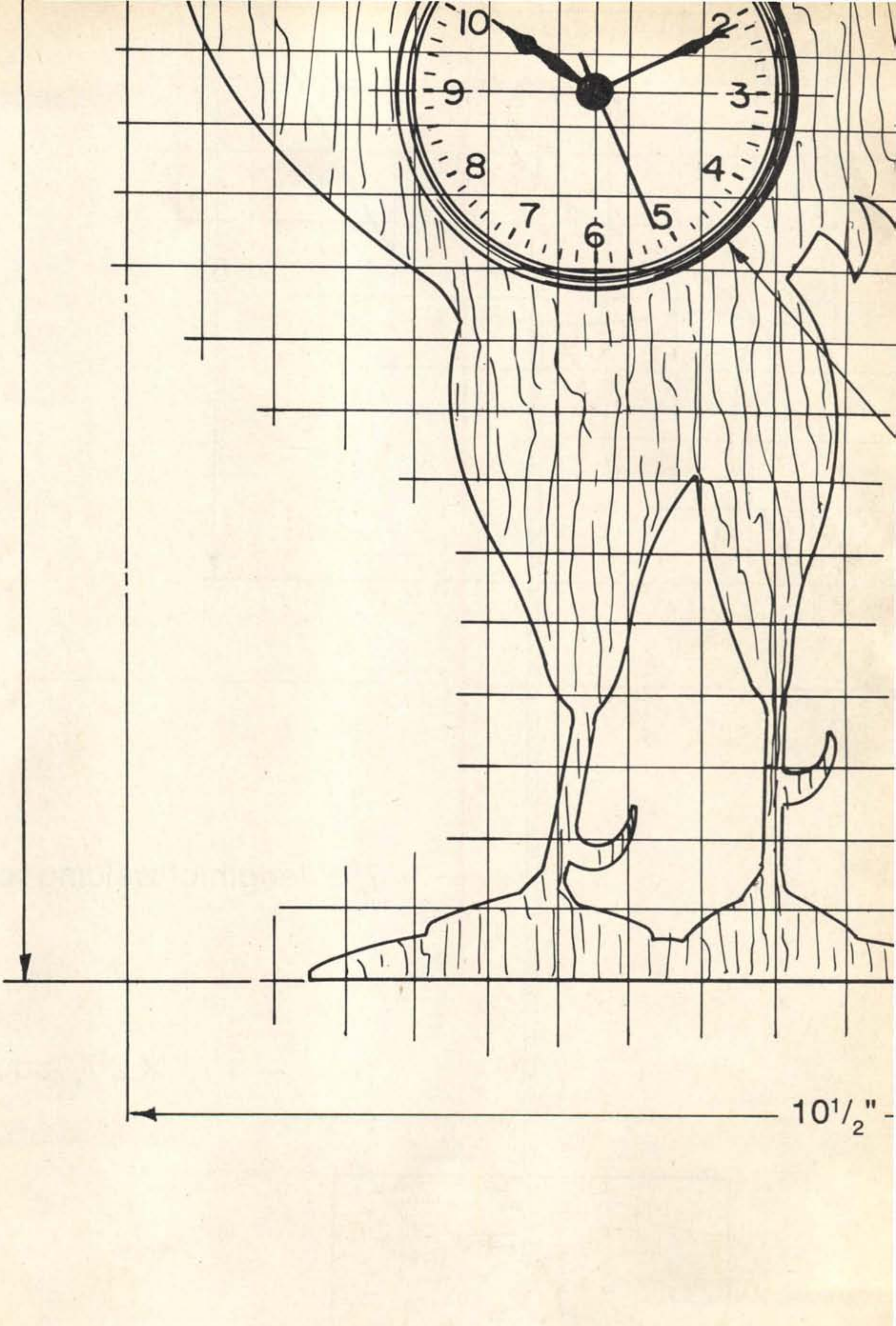
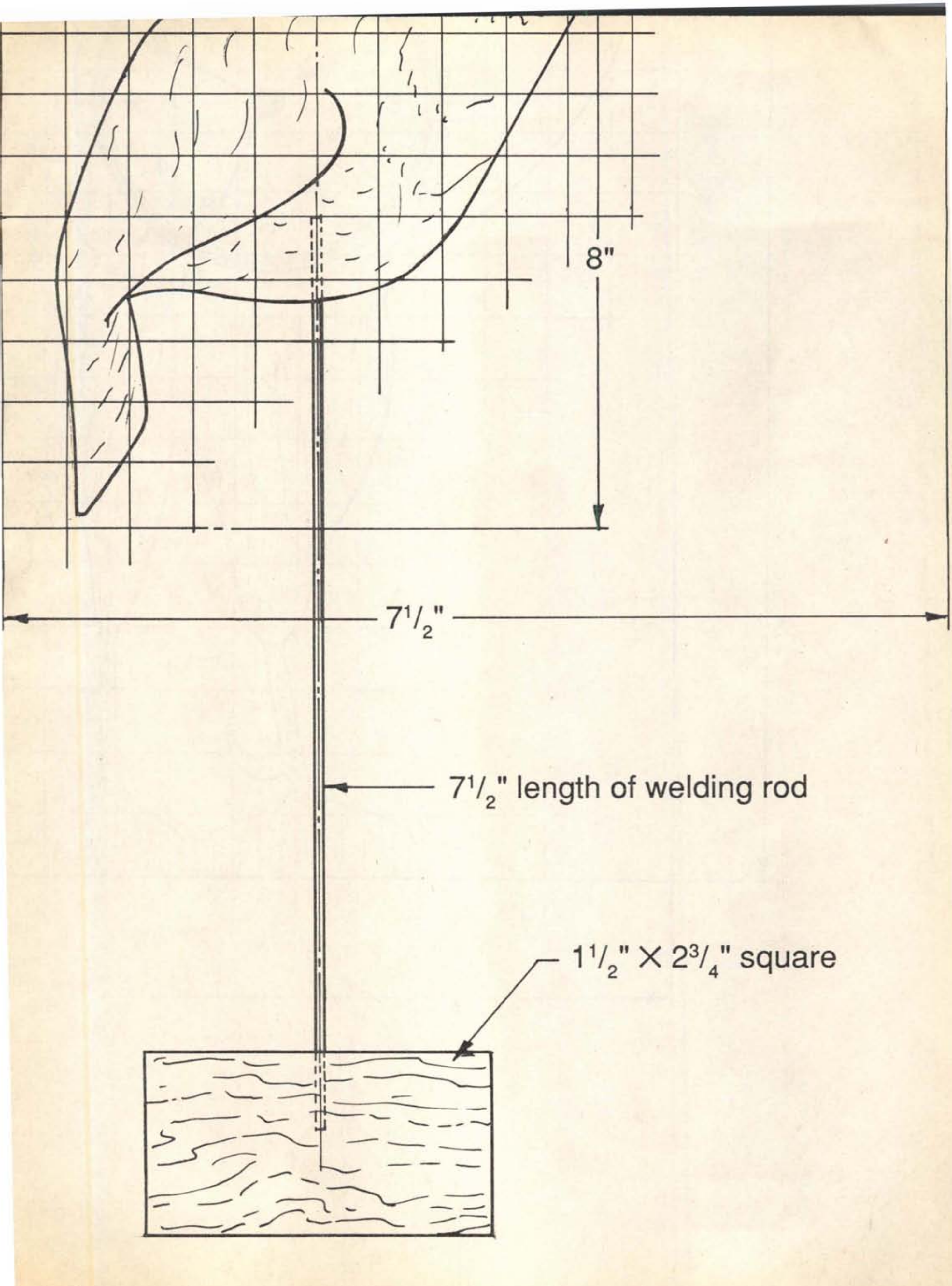

D
4³/₄"

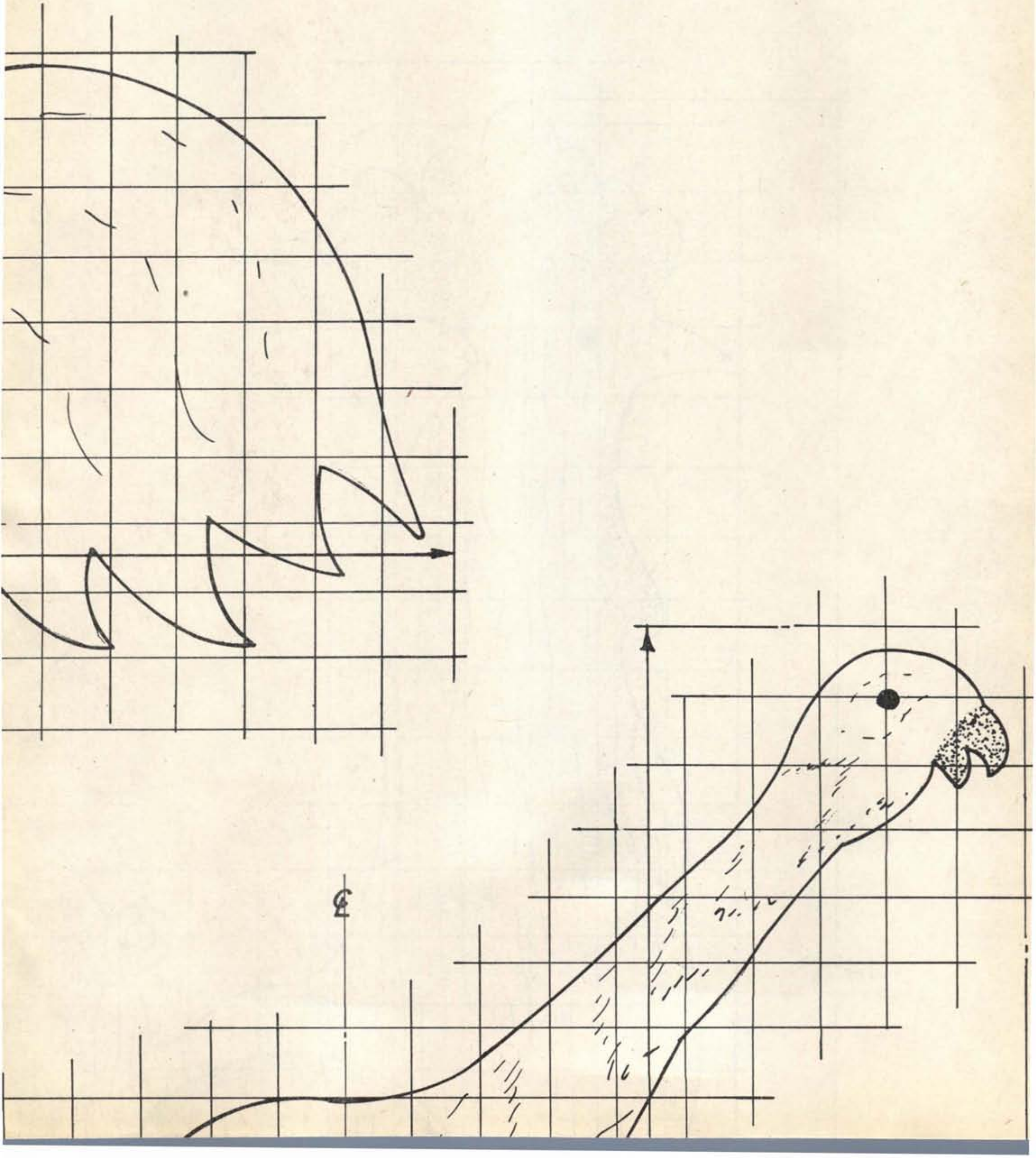
Carefully open staples to remove plans, then bend them closed again.

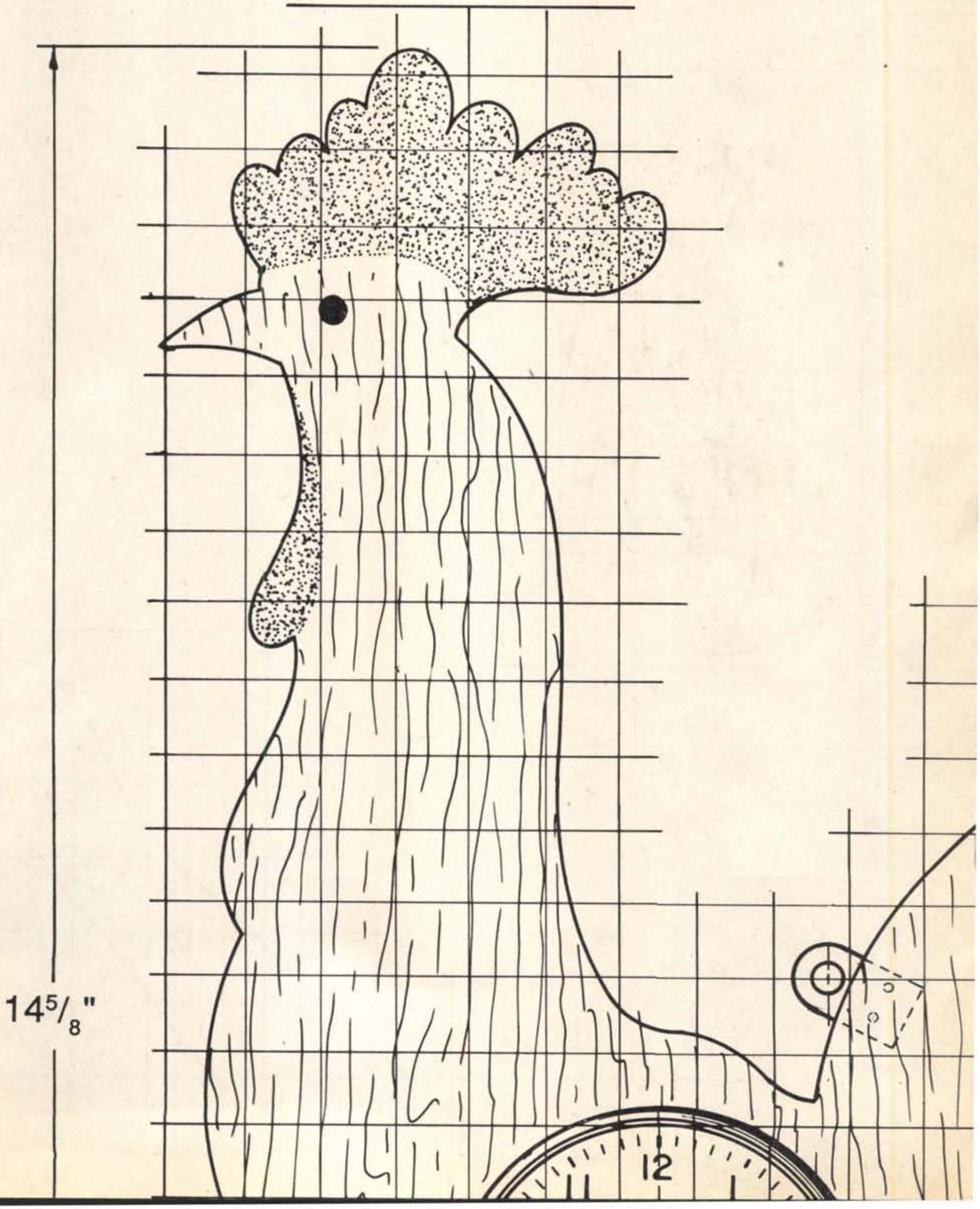


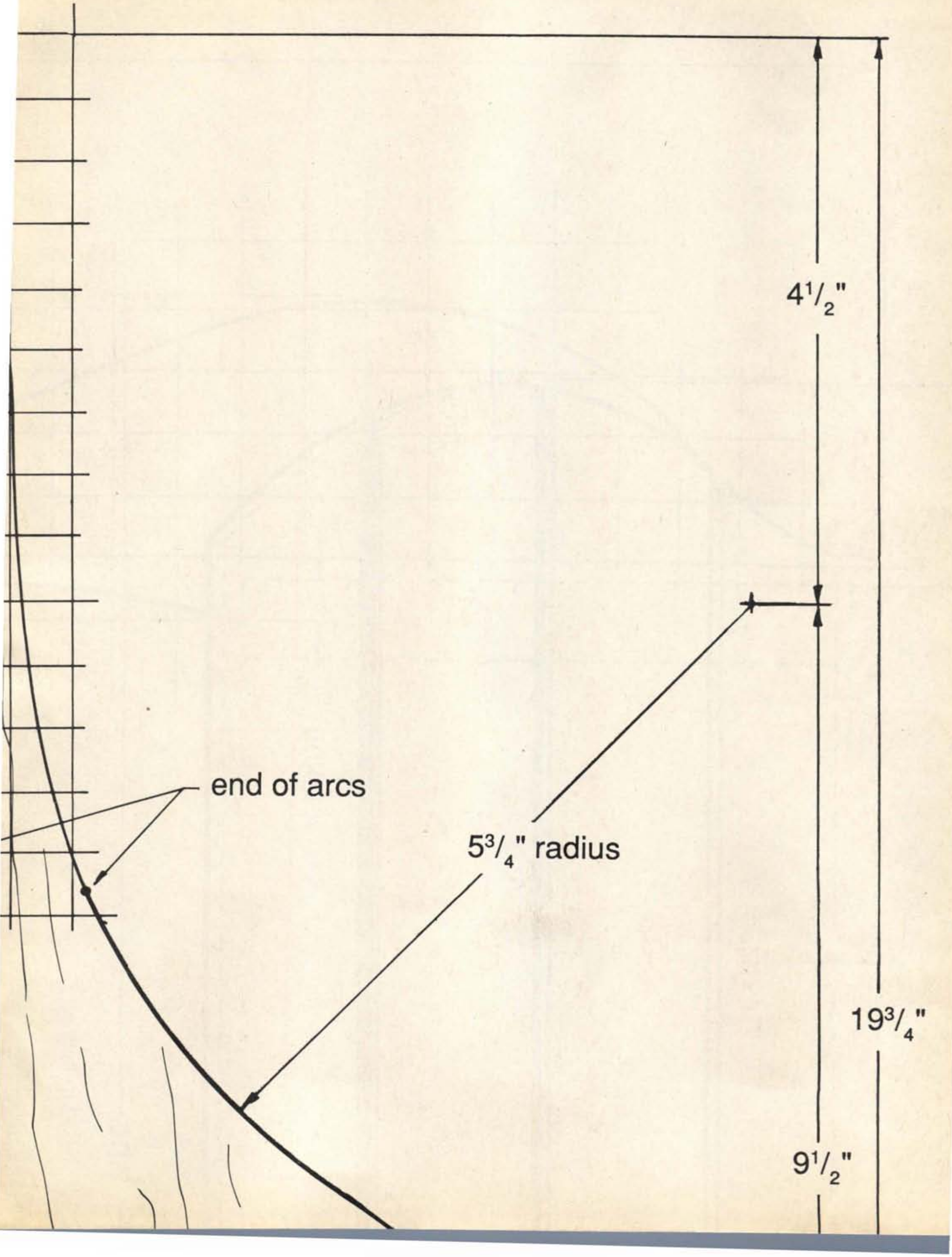

$11^1/_2$" diameter
($5^3/_4$" radius)

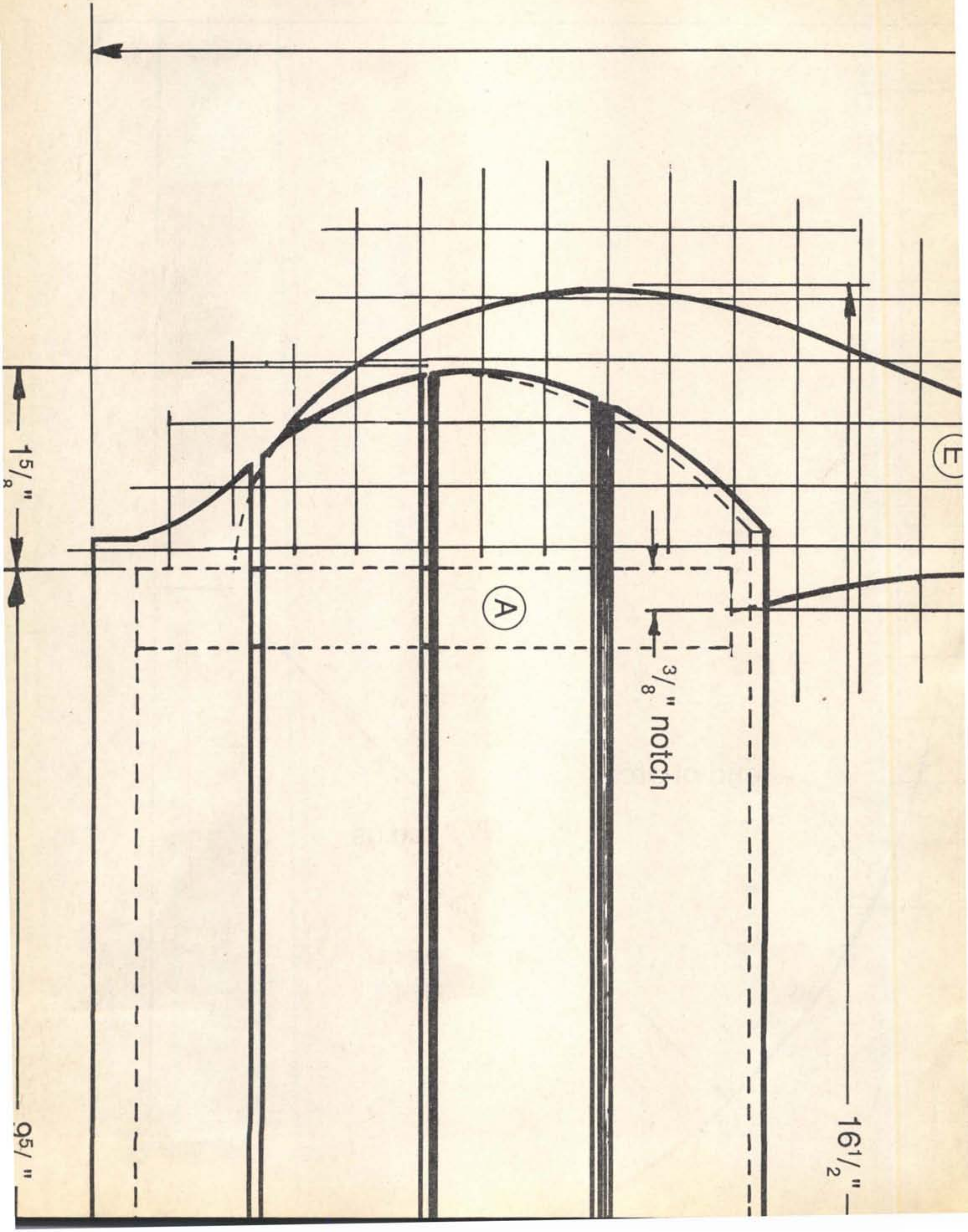

10¹/₂"


8"
7$^1/_2$"
7$^1/_2$" length of welding rod
1$^1/_2$" × 2$^3/_4$" square




14 5/8"
12


4 1/2"
end of arcs
5 3/4" radius
19 3/4"
9 1/2"


1 5/8"
9 5/8"
16 1/2"
3/8" notch
A
E

Bending Wood

by Jeffrey Burr

People have been bending wood for a long time; it may in fact be the oldest form of woodworking, dating back to the first branch bent to form a primitive shelter. Wood is a pliable material, and can be bent into a number of shapes. Craftsmen working in a wide variety of professions have discovered many ways to bend wood to suit their purposes.

All of the methods for bending wood can be divided into the following categories: cold bending, steam/moisture bending, chemical (ammonia) bending, dry heat bending, kerf bending, and bent lamination.

There is some ambiguity in these categories; "cold bending" for instance, may be used to describe any method that doesn't use heat, including bent lamination. The terms vary among the trades.

Kerf bending, one of the simplest ways to bend wood, involves making cuts in the wood along the inside edge of the piece to be bent (see "Octagonal Frames" in this issue for a project using a variation of this technique). Plywood is often bent in this manner (see Figure 1).

Cold bending, strictly speaking, is simply bending a piece of wood and fastening it in place–with the fastening being all that keeps it bent. Any carpenter uses this method on a daily basis, straightening cupped and bowed boards by nailing one end in place, and then forcing the other end into the correct position and nailing it down. Wood bent while still green and allowed to dry also tends to retain its shape (see "Peel Yourself a Settee" in Issue 44, August/September 1988).

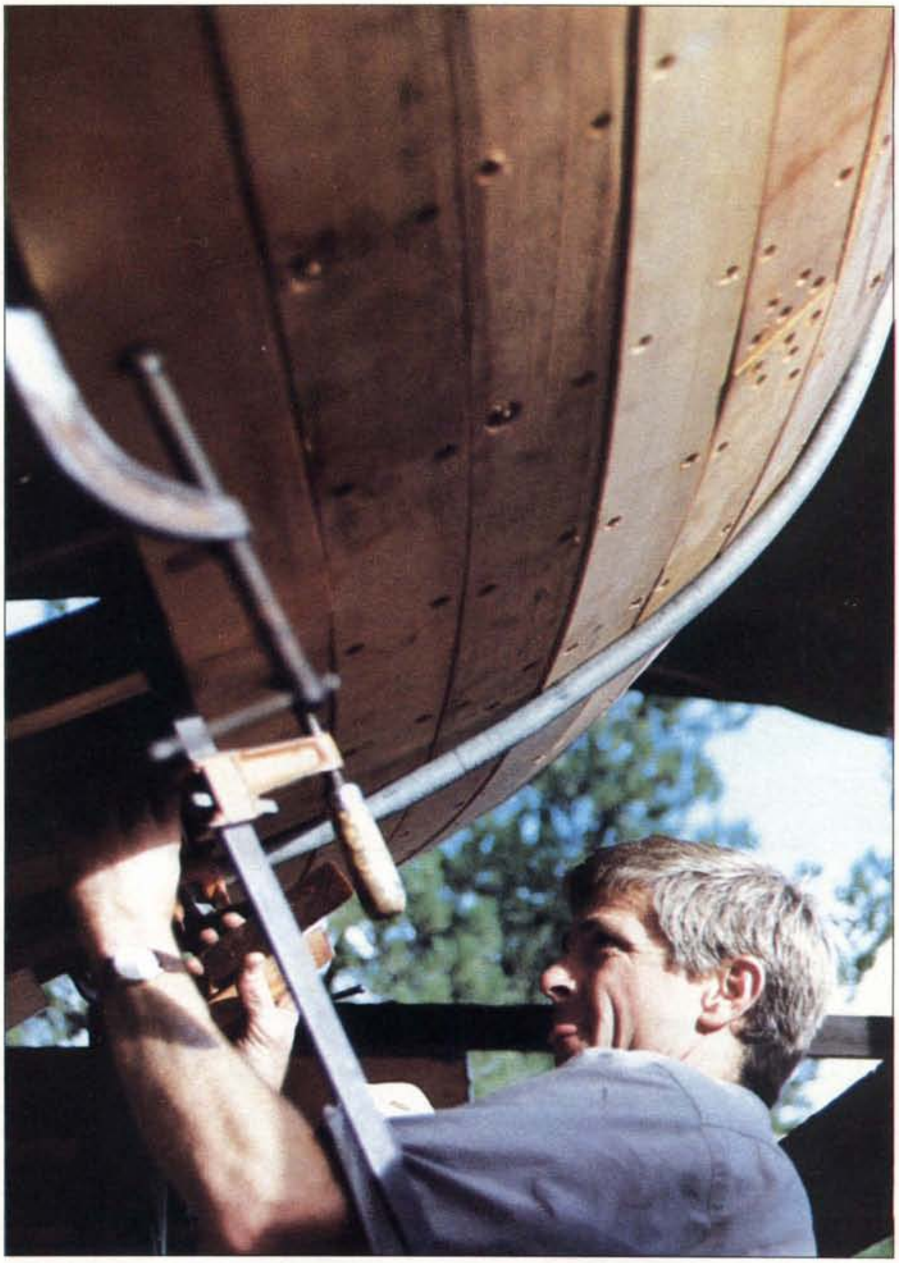


photo by the author

Daniel Jones and his bent-plank schooner. One of the tools Jones has devised is a curved bar clamp, used to pull the steamed wood into place.

Steam Bending

As anyone who has dealt with wood knows, however, it will bend only so far without breaking or simply refusing to move any further. To remedy this, wood has been treated over the years with a number of substances to render it more flexible. The most common of these is steam, though other solvents have been used to plasticize wood. These methods break down the cellular structure of the wood, allowing it to be bent into new shapes. As it dries, the wood becomes solid again, with the cells re-aligned in new positions. This molecular reconstruction is most clearly demonstrated by the technique of ammonia bending, a method developed by researchers at Syracuse University over the last fifteen years. The wood is immersed in ammonia gas, pressurized in sealed tanks. (The ammonia used is pure NH_3, not household ammonia, which is ammonia gas mixed with water and will not render wood bendable.) Wood treated with this solvent emerges extremely pliable, and can be bent into pretzel–like configurations. The equipment required and the extremely hazardous pure ammonia fumes render this method impractical for most woodworkers. (Note: Commercial applications of the ammonia bending process are covered by patent. For more information, contact the Director, Invention Administration Program, Research Corp., 6840 East Broadway Blvd., Tucson, AZ 85710.)

Steam, then, remains the most practical and commonly used method for softening wood for bending. All steaming devices involve the same components: a source of steam (a heating element and water) and a way of delivering it to a container

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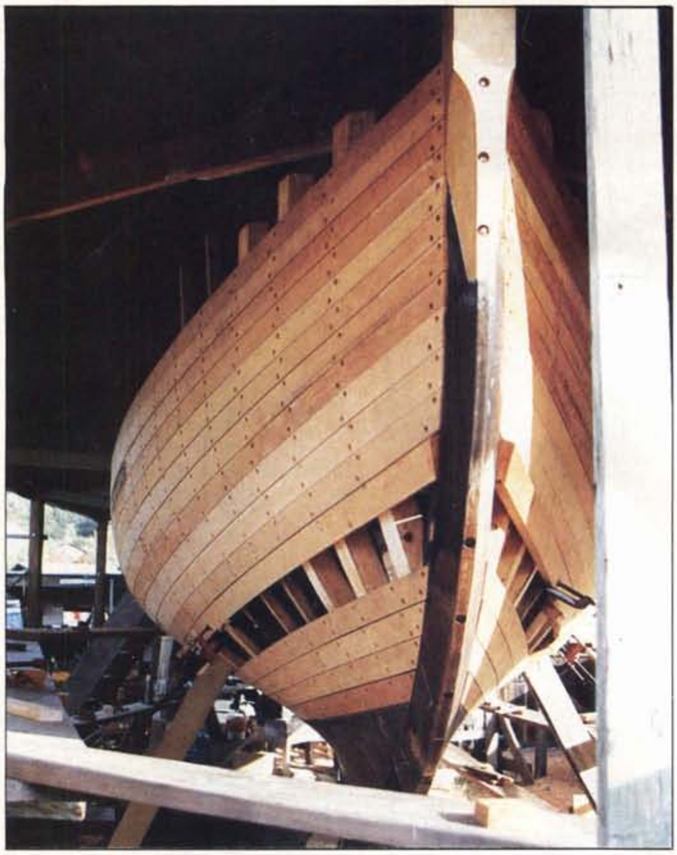
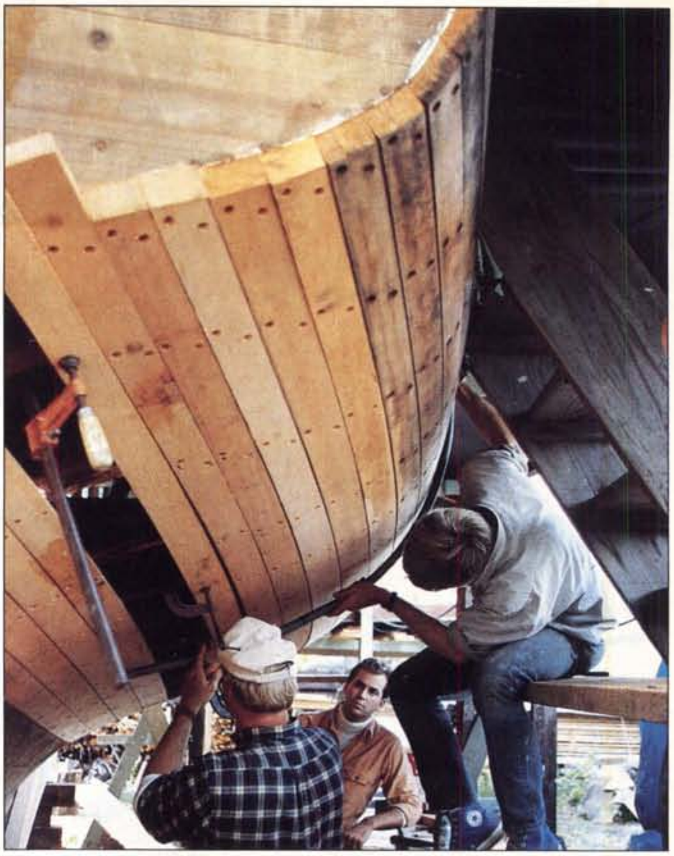
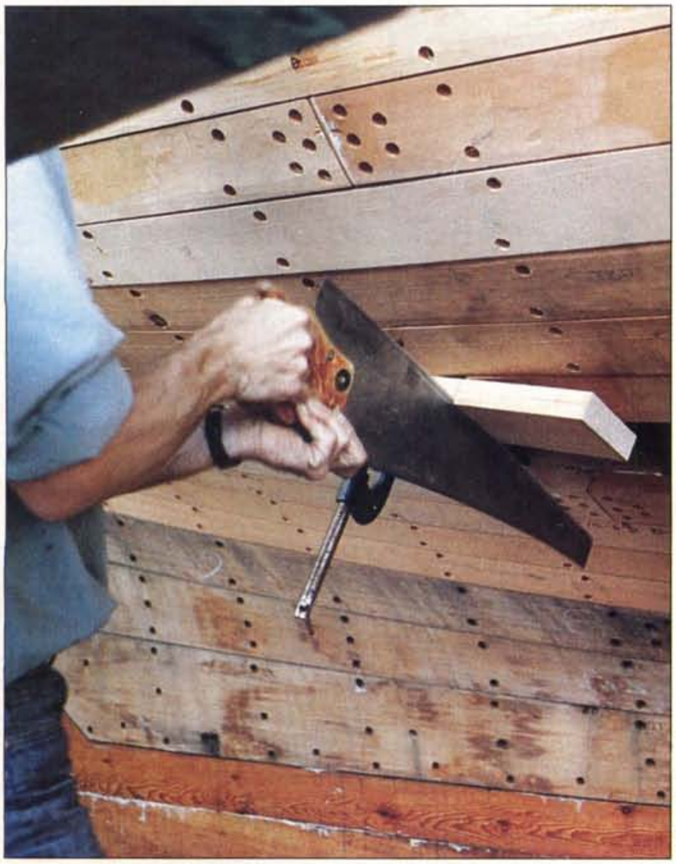
***Jeffrey Burr** is associate editor of* Popular Woodworking.



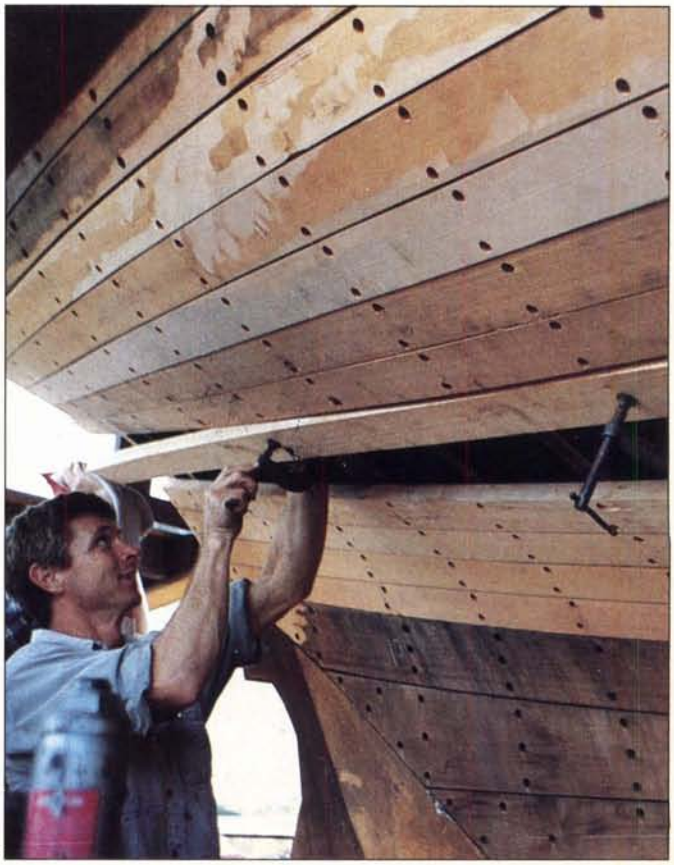
Jones' wooden boat. The ribs, visible in this picture, are mostly steam bent laminations, but a few in each boat are cut from solid stock to lend strength to the hull.



Clockwise from above: A plank is brought from the steamer and attached with "C "clamps, then pulled up tight with the curved bar clamp. Joints are overlapped, and trimmed with a hand saw for accuracy.



photos by the author



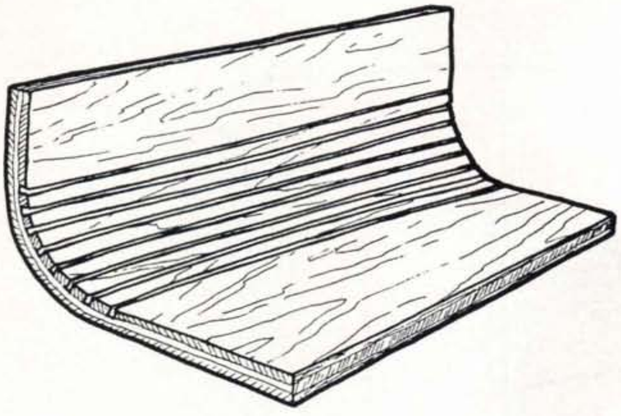


Fig. 1 Kerf Bending Plywood

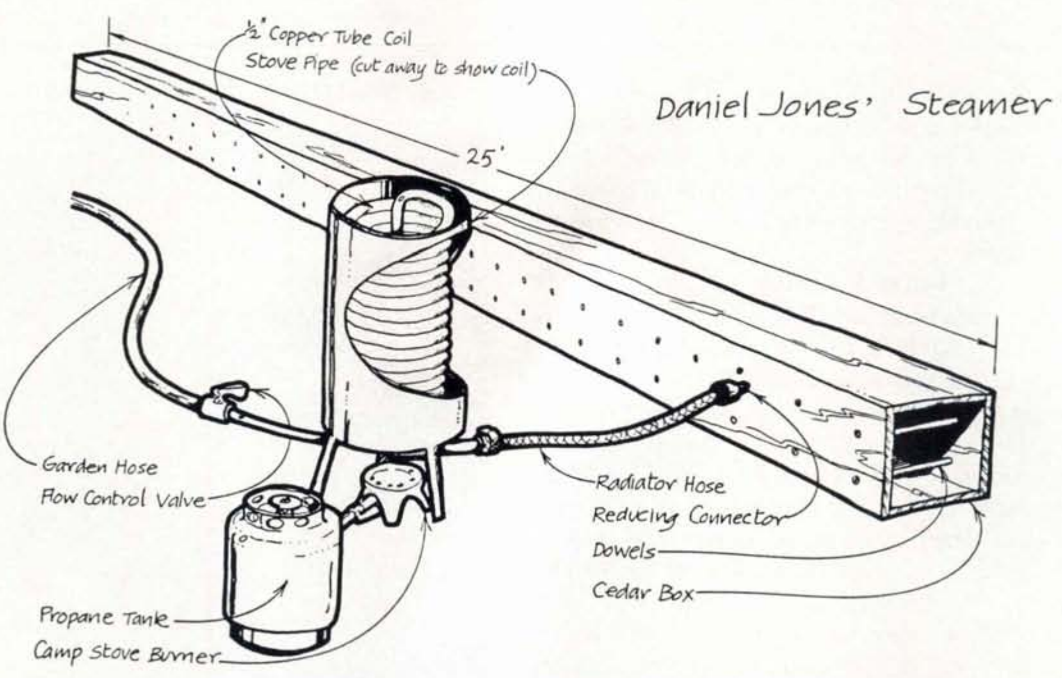
illustrations by Graham Blackburn

where the wood is placed.

Steam Bending A Boat

Daniel Jones, a boatbuilder at the Boatbuilders Cooperative of Sausalito, California, uses steam bending in the construction of a wooden cutter in the yard of his Santa Venetia, California home. His steamer is a model of simplicity (see Figure 2). A camp stove burner heats a coil of 1/2" copper tube, which is kept filled with water from a garden hose attachment. This coil, inside a length of stove pipe, is connected to a radiator hose which delivers steam to the chamber, a simple cedar box. Dowels inserted along the length of the box serve as a tray to hold the work, and the open end is covered with a quilt, allowing some steam to escape. Air-dried Douglas fir planks that form the outside of the boat are steamed for one hour per every inch of thickness. After removing a plank from the steamer, Jones moves quickly to clamp it in place, assisted by two helpers. There is only a minute or two to bend the plank to shape before it cools. The planks must curve in a number of directions; the edge-curve is the hardest to achieve. Jones has devised a curved bar clamp for this purpose which fits the curve of the hull (see photo), and after the smaller clamps are in place, uses this custom clamp to pull the plank up tight to the adjacent ones. The plank is attached overlapping on both ends, and is cut with a hand saw for a precise fit. After the plank has dried it will retain its shape, and can then be attached to the frame with heavy rivets.

Fig. 2



Daniel Jones' Steamer

When bending the frame, more severe curves are required, and the stock is thicker than that of the planks. A number of methods besides steam bending are used, including lamination and not bending at all, but simply cutting to shape. When bending these ribs, boat builders have discovered that holding the ends of a piece securely allows a greater bend without breaking. The theory is as follows: When wood bends, it both stretches and compresses (see Figure 3). Steamed wood will compress a great deal before breaking, but it will stretch very little. Wood simply held and pulled into a bend tends to

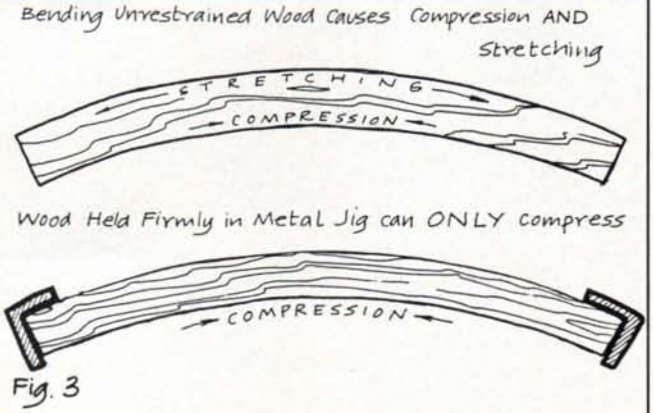
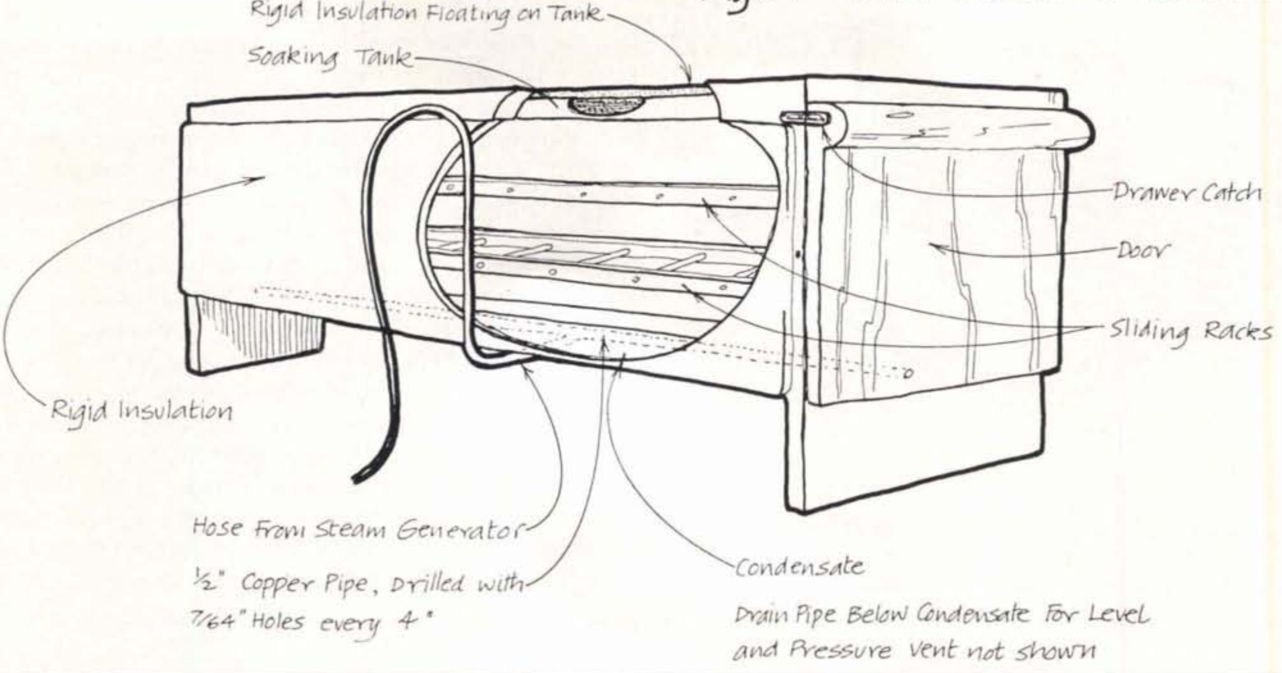

Bending Unrestrained Wood Causes Compression AND Stretching
STRETCHING
COMPRESSION
Wood Held Firmly in Metal Jig can ONLY compress
COMPRESSION

Fig. 3

Fig. 4 Peter Santulli's Steamer


Rigid Insulation Floating on Tank
Soaking Tank
Drawer Catch
Door
Sliding Racks
Rigid Insulation
Hose From Steam Generator
½" Copper Pipe, Drilled with 7/64" Holes every 4"
Condensate
Drain Pipe Below Condensate For Level and Pressure Vent not shown

illustrations by Graham Blackburn

compress at the inside of the curve and stretch at the outside, causing breakage at this point. However, if a piece is held and compressed only, a greater bend can be achieved. Various clamps and jigs have been devised for the purpose of holding the end-grain and keeping it from stretching so the wood will compress as it bends.

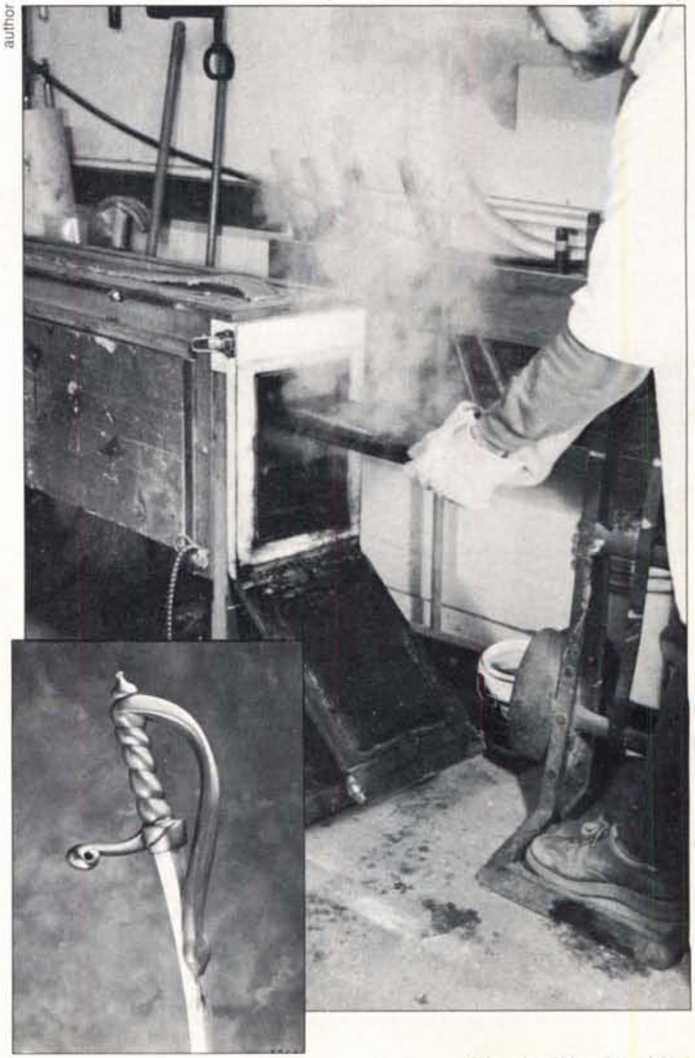
Form Bending

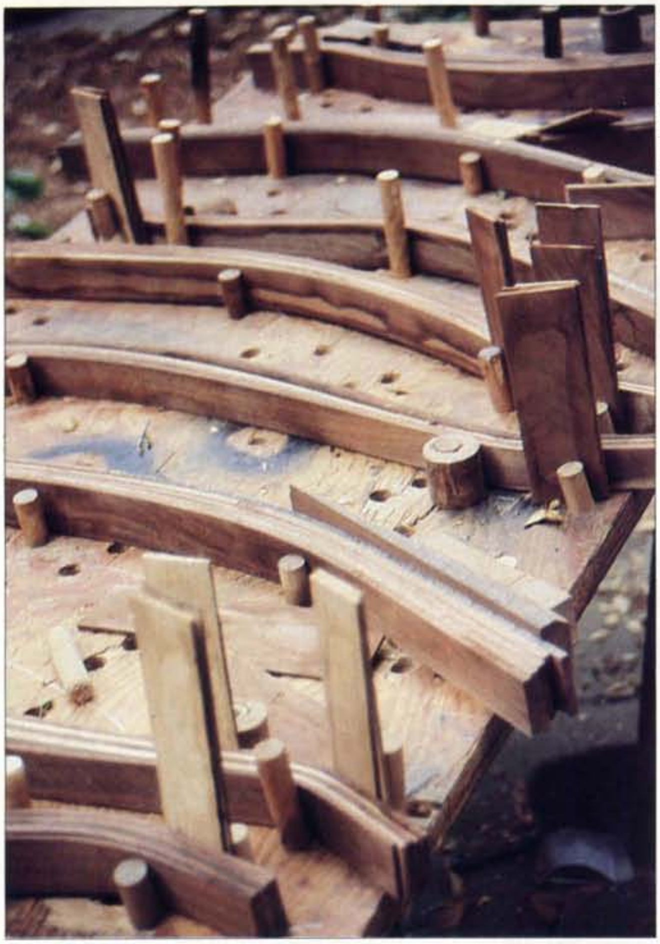
Peter Santulli steam bends wood in his Sausalito, California shop for his custom furniture. His steamer is a more complex device, making use of a Sussman model MB4 steam generator to deliver steam to the bottom of the box, which is filled with water (see Figure 4). Copper pipe with 7/64" holes drilled every 4" allows steam to enter the water and escape into the insulated chamber. The water keeps the steam moist, which seems to be more effective in softening the wood. Sliding racks hold the work, and a top tray is filled with water for soaking the wood before steaming. Santulli finds that breaking the edges of the wood to be bent helps reduce breakage by avoiding grain run. Santulli steams wood for 15 minutes to one hour before bending. He finds that the wood should be bent within one minute from the time it leaves the steam. He then clamps the wood in one of a variety of solid forms, cut from particleboard and plywood.

Another method for bending wood is lamination, the process of gluing thin strips together to form a piece (see "*Quilting* Hoop" in this issue). In bent lamination, what holds the wood in its bent shape is the gluing process—pieces glued side-by-side hold each other in the shape in which they're glued. Arthur Espenet Carpenter of Bolinas, California has been a pioneer in bent lamination for years. Carpenter steams his wood before bending, using trial and error to determine the length of steaming time. The simplest of his bending jigs consists of a base made of two pieces of 3/4" plywood, with holes drilled at various points for the dowels that hold the work. "I used two pieces of plywood to give the pegs plenty of purchase," Carpenter says, "and I try

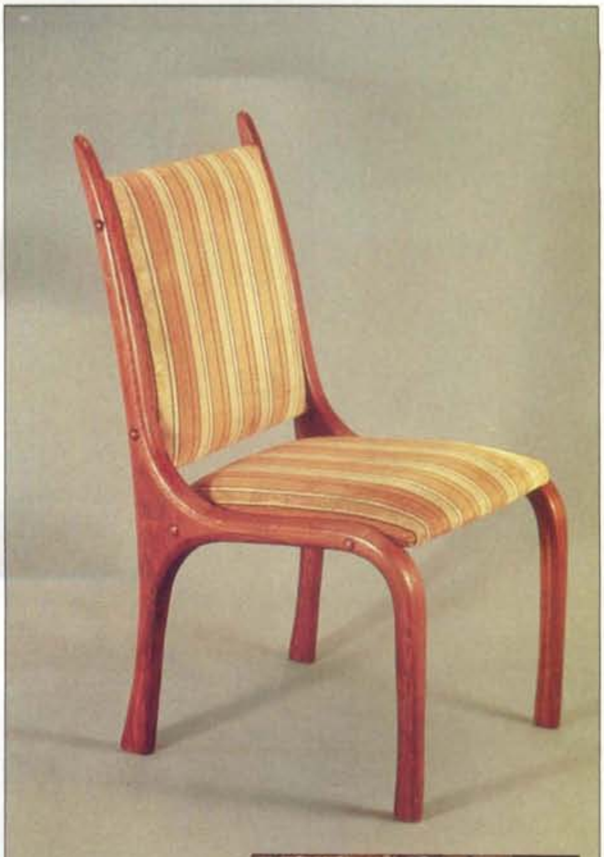
Peter Santulli pulls a hot board out of his steamer. Inset: Snake Sword by Santulli, bent lamination of cherry

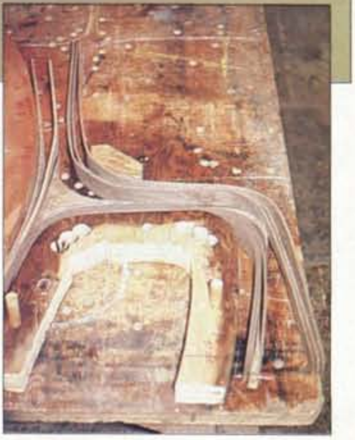
author



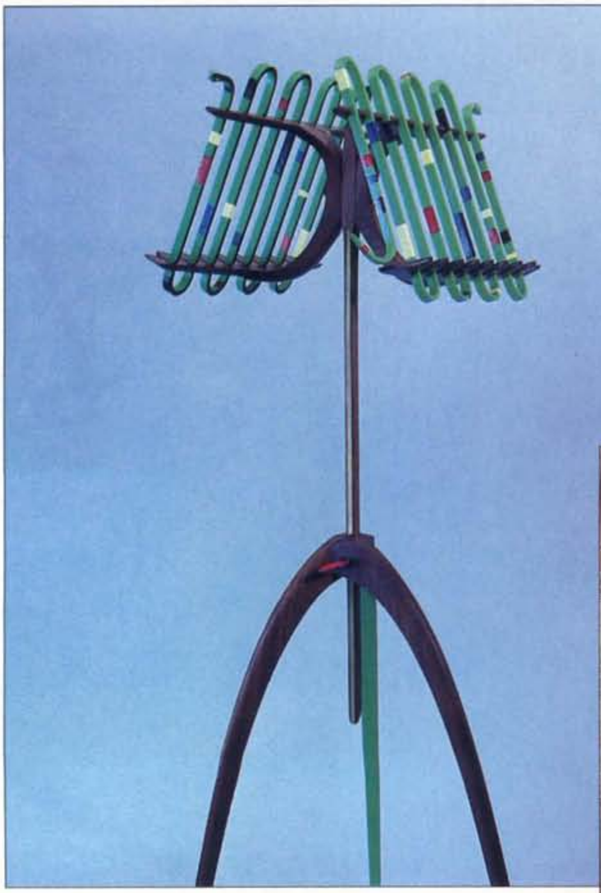


photos by Art Carpenter



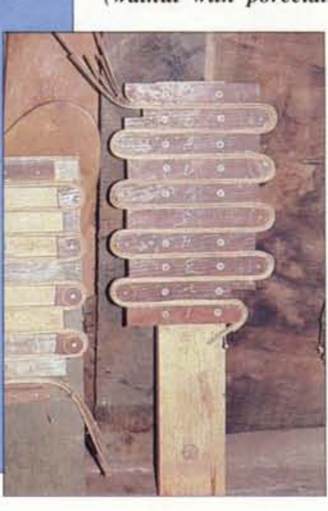


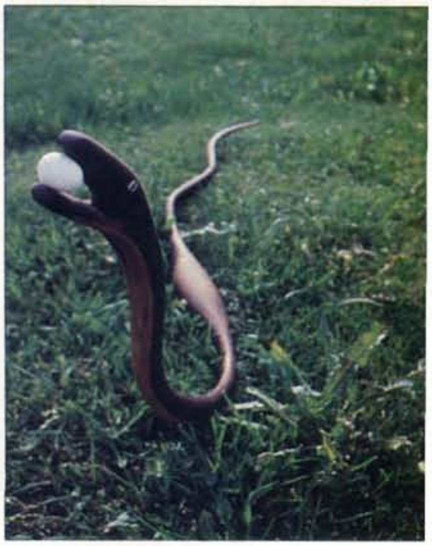
Art Carpenter's laminated furniture and the bending forms used to build it: (above left) variable bending jig, (at right) the "Geary Chair" as it comes off its form, and (above right) the finished chair.

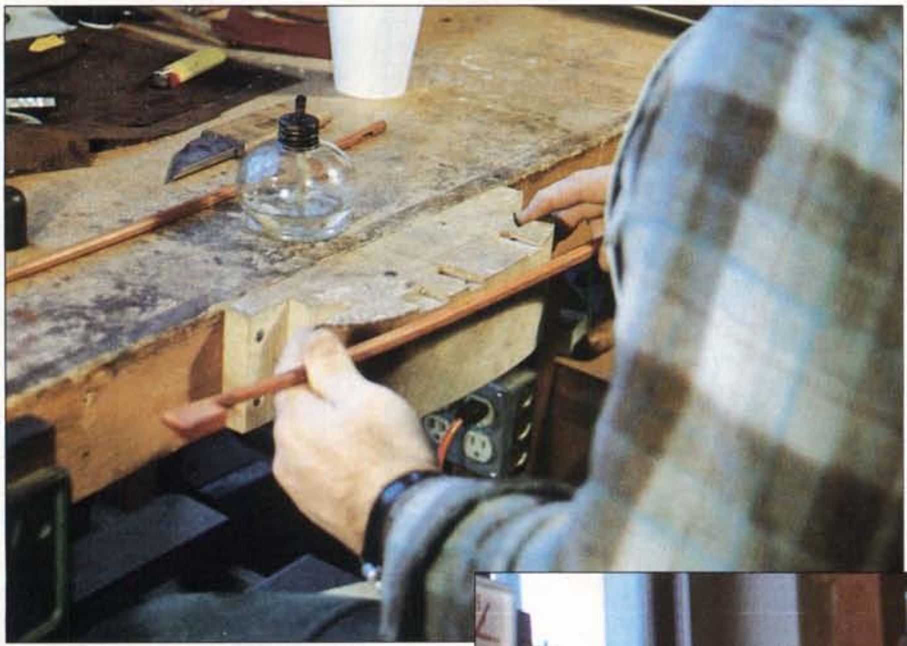


At left: "Snake Music Stand" (rosewood base, music rack of painted, bent cherry veneer), and below, the bending form for its construction

Bottom right: "San Francisco Garter Snake" (walnut with porcelain egg)

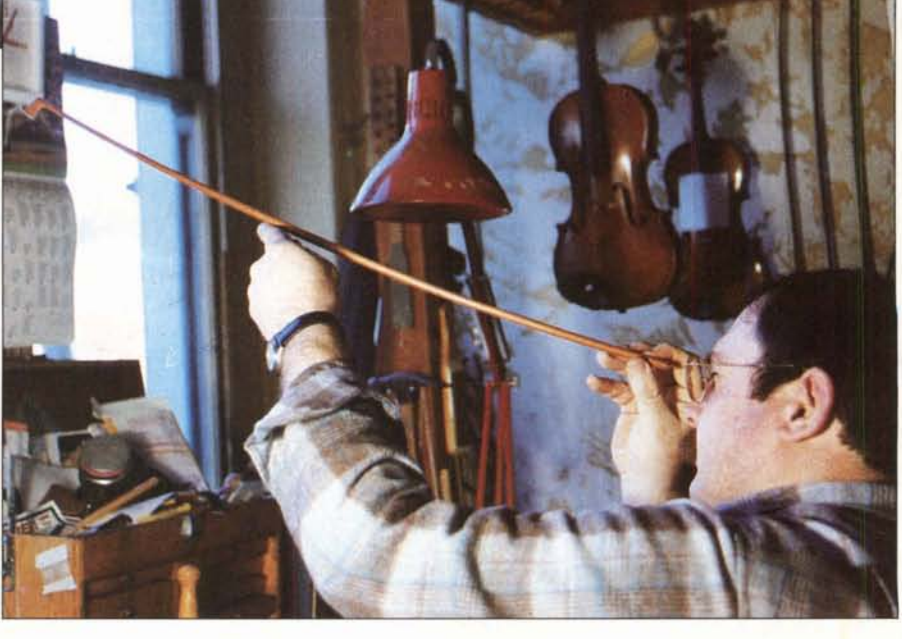






Making a violin bow: Greg Townsend starts with pernambuco blanks (above). After rough shaping, he holds the heated wood against the bending form (left), checking for the proper curve by sighting along the bow as work progresses (below right).

photos by the author



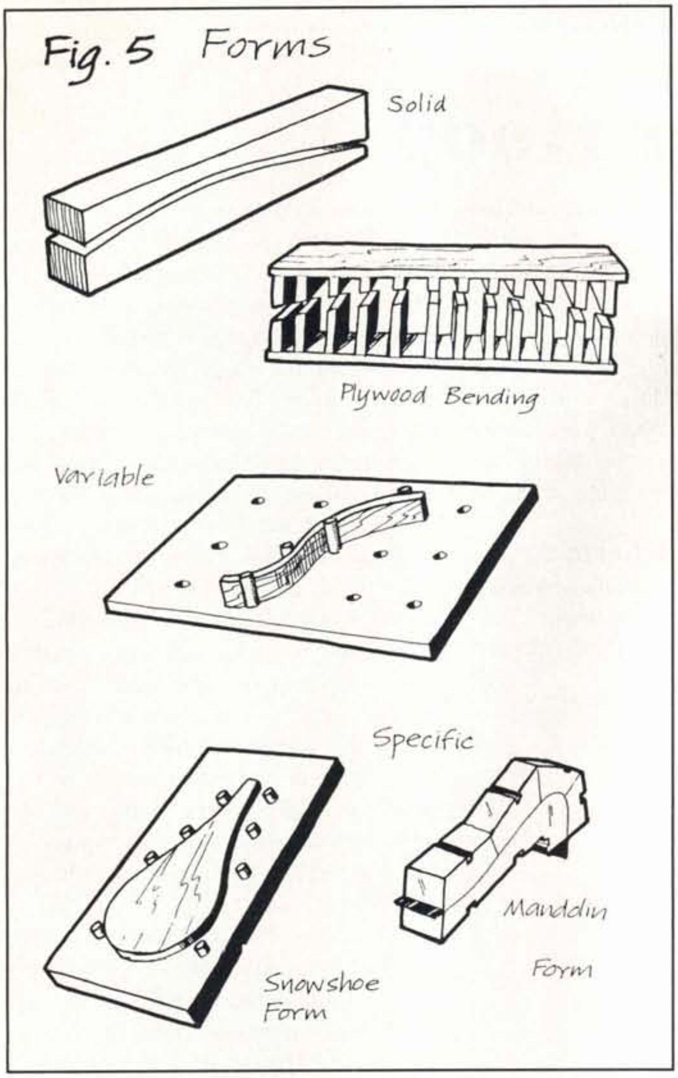


Fig. 5 Forms

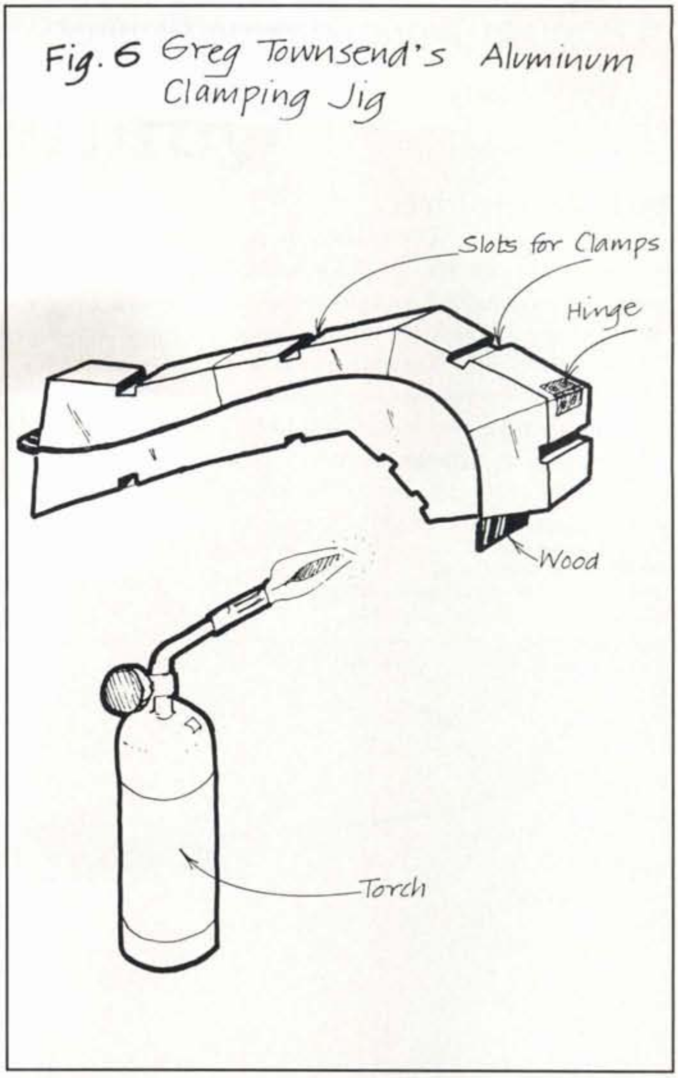


Fig. 6 Greg Townsend's Aluminum Clamping Jig

Illustrations by Graham Blackburn

to lay out the work so as to use as many holes as possible, and then drill new ones as needed. You can't drill too many, though, before the board is useless and you need a new one."

Basically, when bending wood on a form, the principle is always the same: some sort of form is built to hold the wood in the shape desired, with some means of clamping the wood in place. Figure 5 shows some of the basic types of bending forms.

Dry Heat Bending a Bow

Bending with dry heat is a method that has been used by instrument makers for centuries to achieve the graceful curves on violins, cellos, guitars, and other musical instruments. Since the heat is applied as the wood is being shaped (rather than in an enclosure such as in steaming), it gives the craftsman precise control over the bending process. Greg Townsend, owner of Marin Violin in San Rafael, California, makes violin, viola, and cello bows using a flame to heat the wood and then bending it by hand on a form attached to his workbench. Beginning with rough-cut blanks of pernambuco (a wood used for centuries to make bows), Townsend first shapes them with a high–angle plane. He heats a blank over an alcohol lamp, judging the correct temperature by feel—heating the wood until just before it burns his hands. The form, attached to his workbench, is a "generic" shape, useful for making a wide variety of curves. After heating the wood, Townsend holds it against the bending form, judging by eye how much bend to put in the bow and holding it in position until it cools. It's a slow process, requiring many moves between the flame and the bending form. He checks by sighting down the length of the bow, checking for a smooth curve.

Townsend, who studied bow-making with masters in Paris, France and in this country, also builds mandolins using a custom-made aluminum bending form to bend the sides (see Figure 6). This ingenious form consists of a number of pieces (some of which are hinged) and has slots for clamping. The wood is preheated and clamped into the form, and then the entire assembly, form and all, is heated with a propane torch. When it cools, the wood will retain the bent shape.

Some woods bend more easily than others; in general, harder woods tend to bend more smoothly and softer woods tend to crack and break more easily when bent. For severe bends, ash, white oak, red oak, and koa are the best. Walnut will also bend well and tends to have a good "memory" once bent. Of the softwoods, air-dried fir or cedar are used generally in applications in which less severe bends are required. Partially air-dried wood is better than kiln-dried or wet wood; wet wood has too much moisture in it to bend well, and kiln-dried wood is often too dry. In all cases, straight-grained wood is preferred for bending. PW

A Popular Woodworking Project

Quilting Hoop

by Jacob Schulzinger

Quilting is a marvelous hobby for the seamstress in the family. Like woodworking, it is a chance for creative expression in a form that has a practical purpose. The woodworker in the family can make a tool for the seamstress by constructing this quilting hoop and stand. Built like a large embroidery frame, the hoop consists of two ovals, one inside the other, which act as a clamp to hold the quilt in place. The hoop can be used either on the stand or off, though many quilters prefer holding the hoop in their lap while working, and reserving use of the stand for display or storage of their work in progress.

Jacob Schulzinger *is an industrial engineer in the aerospace industry. Woodworking is his part-time business and hobby.*

This project introduces you to the process of bent lamination, a technique for making curved pieces by gluing thin strips together and clamping them to shape.

Making the Form

To begin, you'll need to make a bending form for gluing up the hoops. Start with two 28" long pieces of 1 × 12 pine. Butt these two boards side by side, and join them with corrugated fasteners. These are temporary joints, so the fasteners need not be driven in all the way.

Lay out the shape for the elliptical gluing form by first marking out a line perpendicular to the joint, crossing the joint line at the exact center. Now you have a cross, with the joint as the horizontal axis and the line you just marked as the vertical axis. Following the layout in Figure 1, mark out points p1, p2, p3, and p4. Place the point of a beam compass at p1, and draw an arc with a radius of 4-13/16" on the horizontal axis, as shown. Locate p2, and draw a similar arc on this side. At p3, and p4 on the vertical axis, draw an arc with a radius of 17" across from the swing points, on the opposite side of the board. When you're finished, the arcs should join up, forming an ellipse.

This ellipse that you've drawn will be the outer edge of the form. You'll need to remove the material from the inside edge to create a bearing surface for the clamps. This inner edge can be drawn freehand, about 1-1/2" inside the outer ellipse.

If, like me, you have qualms about wasting so much of a wide board, another option to this layout procedure is to use a 6' length of 1 × 10 to make the two 28" pieces plus two 6" blocks. Use corrugated fasteners to attach these short pieces on either side of the long boards as shown in Figure 1, so that they can serve as the swing points for the beam compass.

When the layout is complete, separate the boards, and cut out the form carefully. Sand the outer edge until it's smooth; any irregularities will be transmitted to the hoops.

Butt the two halves of the form together, and nail them to a 3/4" plywood base. Cut the plywood roughly to the shape of the ellipse but an inch or so oversize. Finish the fixture with a coat of varnish and some paste wax.

Hooping It Up

I made the hardwood strips for the hoops (A) from a 3/4" × 3" × 66" piece of oak, ripped into nine 1/16" thick strips.

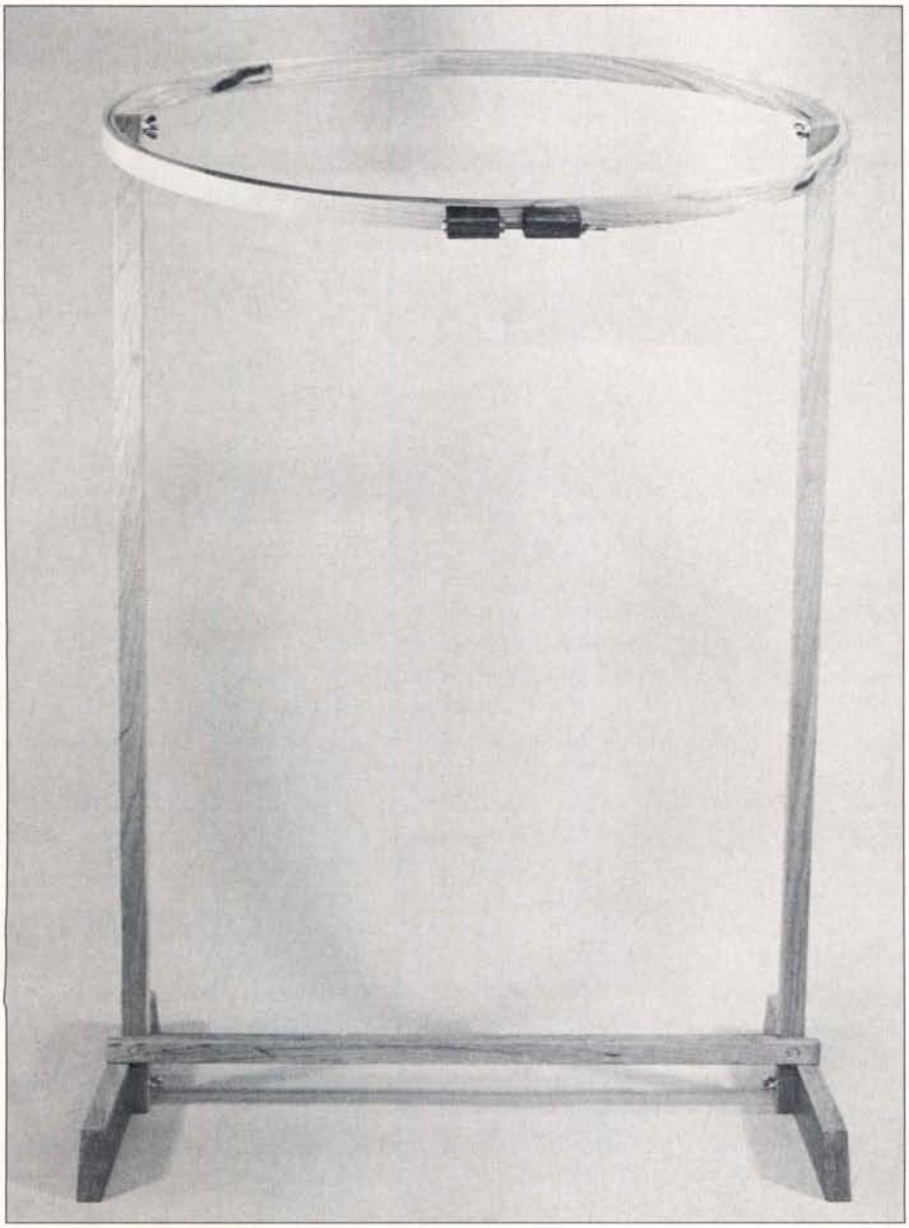
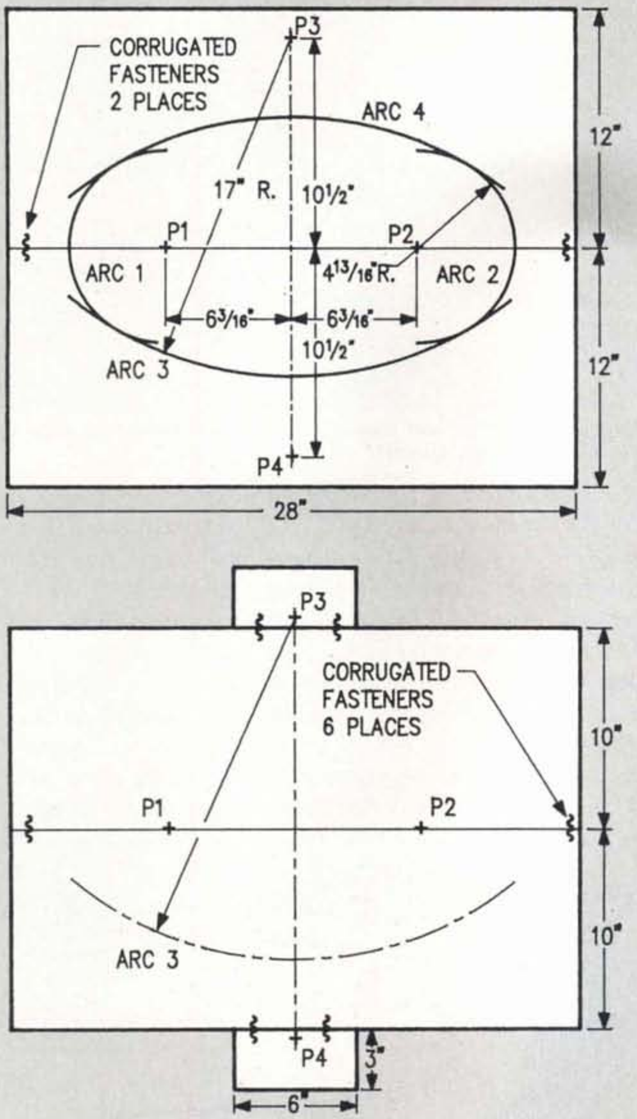


photo by the author

Figure 1



illustrations by Tom Larson

You need three for each hoop, and the extras are handy in case one breaks while bending. Sand the strips lightly, and taper about 4" of the end of one strip as shown in Figure 2.

Apply a heavy coat of paste wax to the gluing form, to keep glue from adhering to it, then wrap the tapered strip around the form, clamping it in place as you go. When you come around to the starting point, remove the first clamp, apply glue to the portion of the strip that overlaps and then reclamp. At this point, you can see how the taper allows a smooth transition as the strip overlaps itself. Butt the end of the next strip against the square end of the first (only the first strip is tapered), and wrap it around the form, gluing liberally where it contacts the first strip. Butt the third strip against the squared end of the second, and glue and clamp it in place. Trim the last one so it extends about 3" past the point at which it starts to form a fourth layer; you'll taper its outside surface after removal from the form. Make sure to use enough glue so that you get squeeze–out all the way around, and be sure that all layers have full contact.

Remove the hoop after 24 hours, and apply another coat of paste wax to the form before beginning the second hoop. Build this the same as the first, and let dry.

Sand off all excess glue from the hoops, and taper the end of the last strip, sanding until it flows smoothly into the one underneath and forms an even surface on the outer face.

I made the clamp (B) out of walnut,

Drawing Ellipses

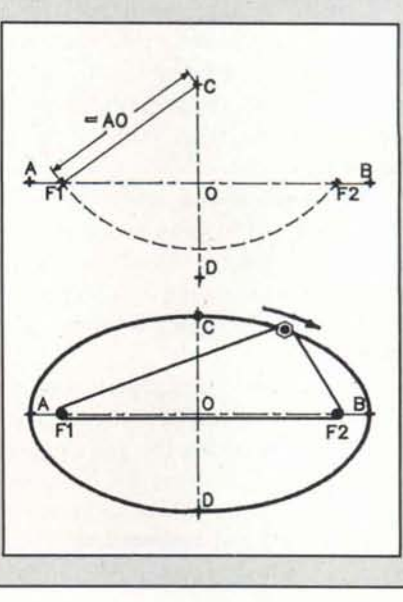
by Tom Larson

The following method can be used to draw ellipses of any size, using a compass, two nails, and a piece of string. First, draw two perpendicular intersecting lines, forming a vertical and a horizontal axis as in the top drawing to the right. Starting at the midpoint (O) measure along the horizontal axis half the width of the ellipse you want and mark at point A. Do this again at point B. Now measure half the height of your ellipse along the vertical axis and mark with point C. Repeat the process and mark point D.

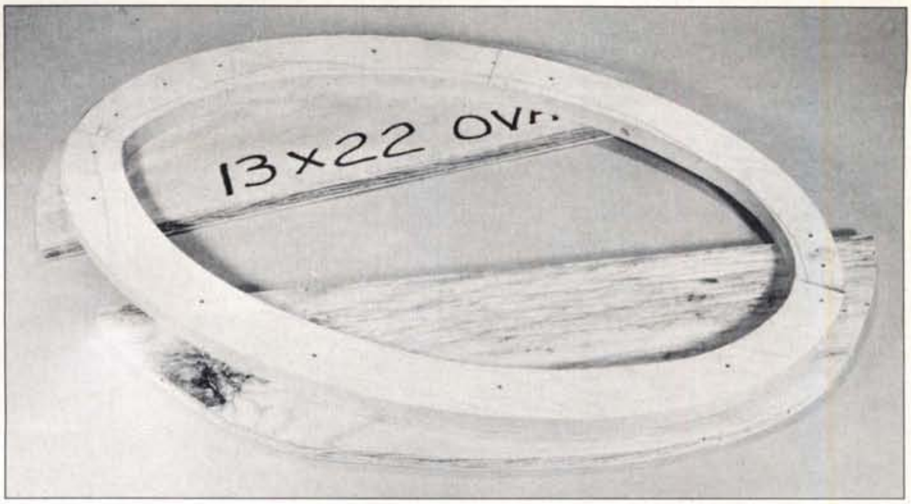
Next take a compass and set it to the distance AO, then place the point at C and mark an arc across the horizontal axis. The point where the arc crosses is point F1. Do the same on the other side, marking out point F2.

Now drive nails at points F1, F2, and C. Tie a loop of string around the nails, and then pull out the nail at C. Use the loop to guide a pencil, and draw your ellipse, as in the bottom drawing.

***Tom Larson** of Larson Graphics in Concord, California does much of the illustrating for* PW.



photos by the author



Cut out the inside of the form and attach it to some plywood scraps. The plywood forms a corner to align the strips against.

which looks nice against the oak hoops. Cut it to the rough size given in the cutting list, and trace the outside of one hoop onto the block. Set the hoop so it just touches the corners of the block, and scribe the arc into the walnut. Cut the block along this line, and sand it so that it fits against the curve of the hoop. Drill a 7/32" hole through the center of the block lengthwise, then cut the clamp into two pieces, each 1-1/2" long.

Since both hoops are the same size, you'll need to cut one to allow it to clamp over the other. To do this, put one hoop back on the gluing form, and mark the midpoint on a long side, using the line from the vertical axis on the form. Make the cut here, splitting the hoop open, and sand the ends smooth. Drill countersunk holes for #3 × 3/8" screws at 1/4" and 3/4" in from the cut ends. Glue and screw the two halves of the clamp in place so they extend past the free ends of the hoop by about 3/8". Insert the 10–24 × 4-1/2" machine screw, nut, washer and wing nut as shown in Figure 3.

Building the Stand

Cut the pieces of hardwood (I used cherry) for the stand to size, beginning with the two legs (C). Cut the rounded slots in the upper ends of the legs by first drilling 3/16" holes and then making two saw cuts down to the edges of the hole. Cut the pieces for the base (D) with 30° angles on the ends, and then cut a 3/4" wide × 5/16" deep dado at the center of the inner faces to accept the legs. Place the legs in the dadoes and drill two 3/16" holes through each assembly for the machine screws.

I've given dimensions here for a spreader (E) that is wider than the one in the photo to help make the stand sturdier. Cut a 1-5/16" wide, 3/8" deep notch on each end to fit around the legs. With the leg and base pieces assembled, clamp the spreader in place and drill two holes through each end so you can bolt it to the legs. All pieces are fastened with 10/24 machine screws and wing nuts, so you can take the stand apart easily for moving or storage.

With the inner hoop placed back on the gluing form, mark the horizontal center on each end, using the seam on the form as a guide. Remove the hoop and drill a 3/16" diameter hole in the center of the hoop at each end, countersunk on the outside face for the screws. Be sure that these holes are sunk enough to accept the heads of the machine screws fully; the quilt and the outer hoop will ride against this surface, and any screw heads sticking up may snag the quilt and cause a less–than–tight fit. Insert the screws and wing nuts with the nuts on the inside, and set the hoop on the uprights to check for fit. Tighten the nuts, and put the outer hoop on, tightening the clamp just enough to hold it in place. When it all fits, disassemble the pieces for finishing. Finish sand all pieces, taking special care that the two hoops are free of rough spots or splinters.

I used a few coats of tung oil to bring out the natural color of the wood, followed by a coat of paste wax. After drying you can reassemble, put down your tools and pick up a quilting needle, or you can give the piece to your favorite quilter as the perfect gift. PW

Figure 2

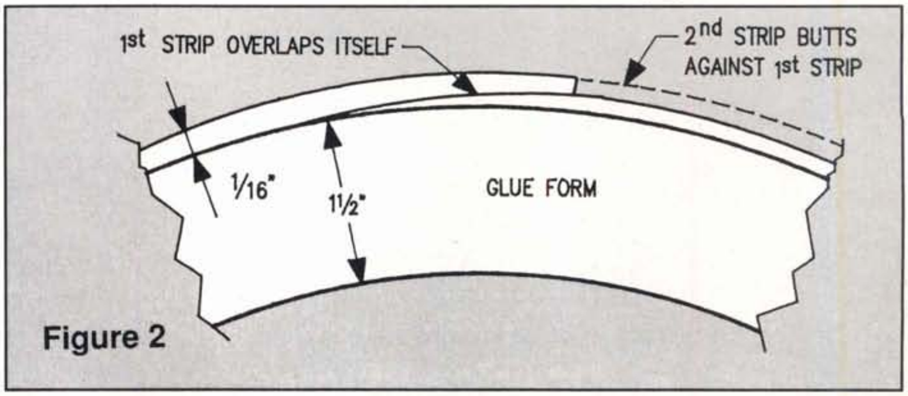
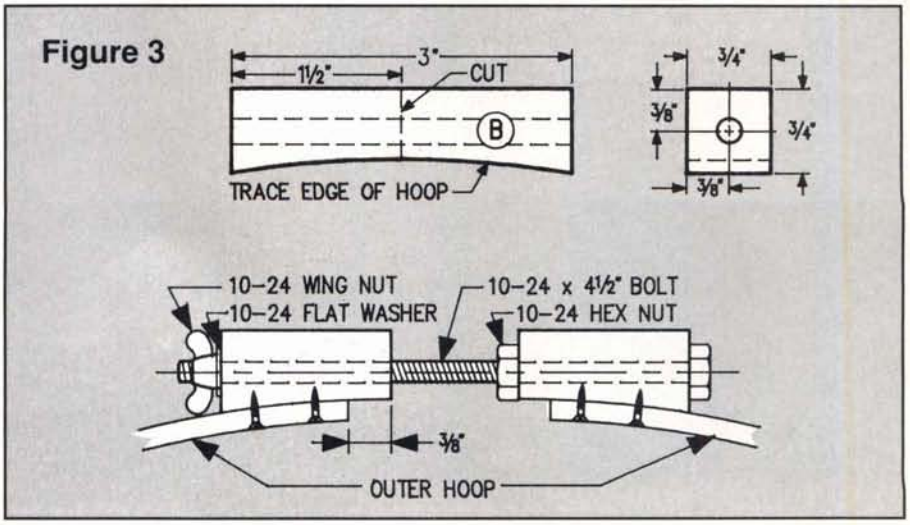
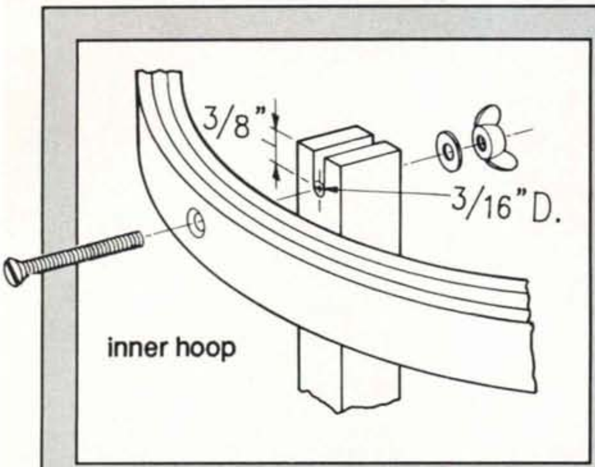
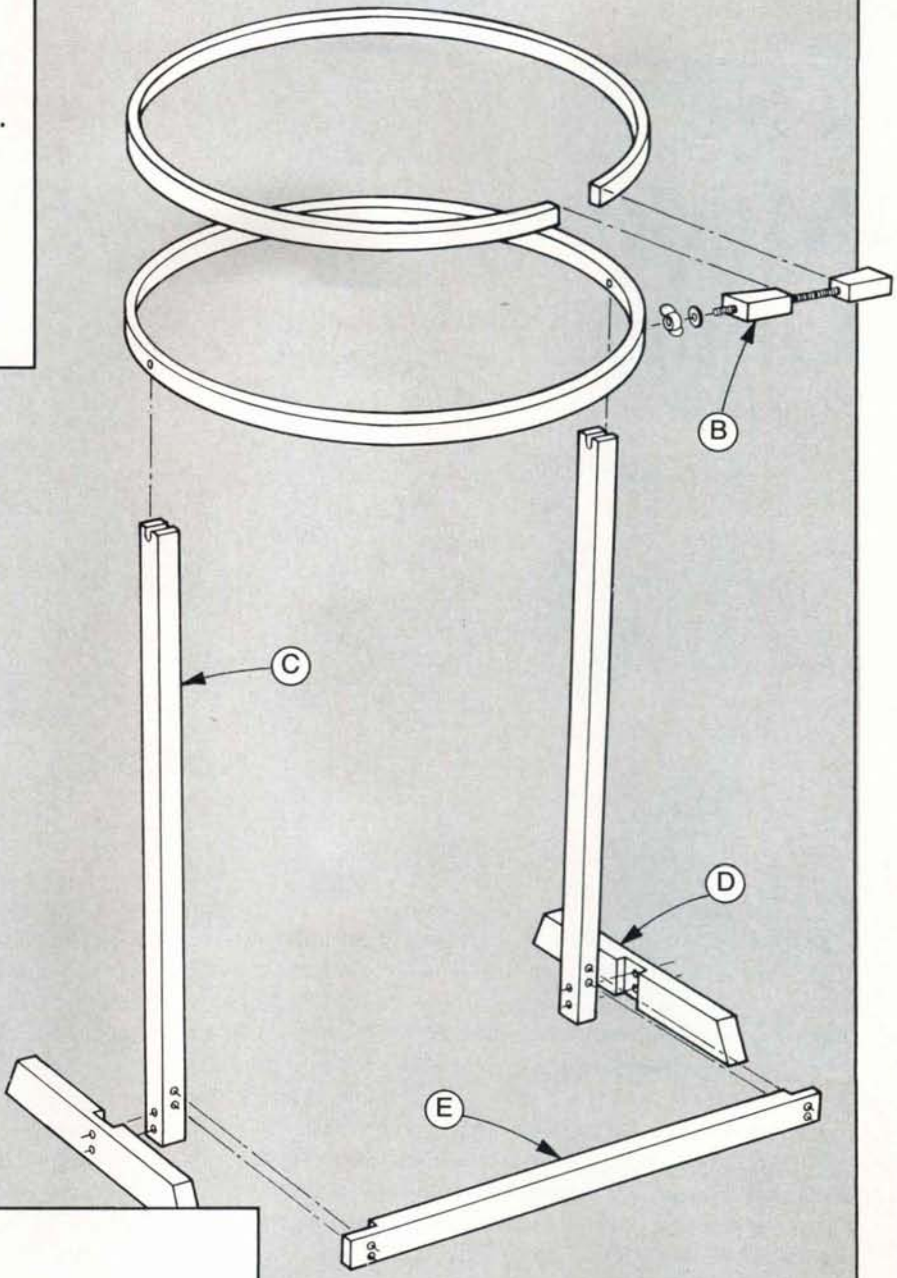


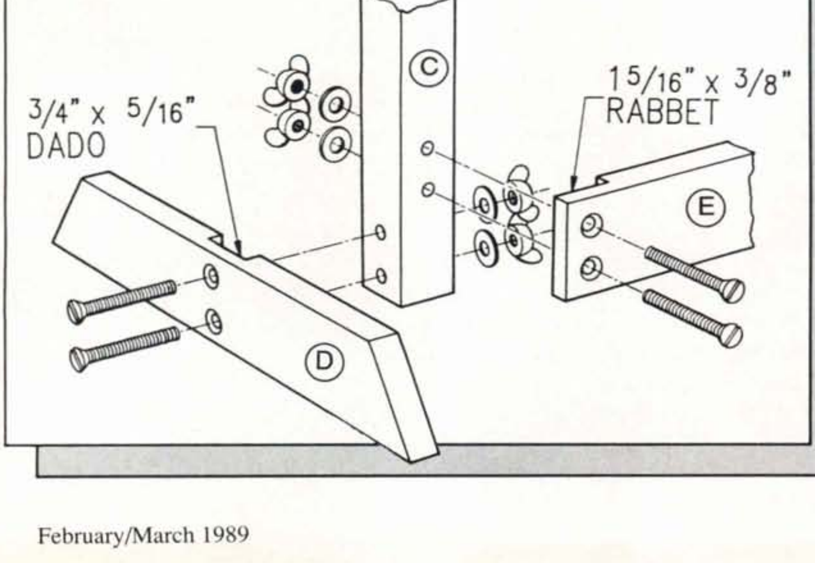
Figure 3







Quilting Hoop and Stand					
Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
9	A	1/16"	3/4"	66"	hoop strips
1	B	3/4"	3/4"	3"	clamp
2	C	3/4"	3/4"	32"	legs
2	D	3/4"	1 3/4"	14"	base pieces
1	E	3/4"	1 3/4"	22 3/4"	spreader
Supplies					
4	#3 × 3/8" flat head wood screws				
4	10–24 × 1 3/4" flat head machine screws				
6	10–24 × 1 1/2" flat head machine screws				
1	10–24 × 4 1/2" machine screw				
15	10–24 wing nuts				
1	10–24 hex nut				
17	#10 flat washers				



Project for the Shop

The Marking Gauge

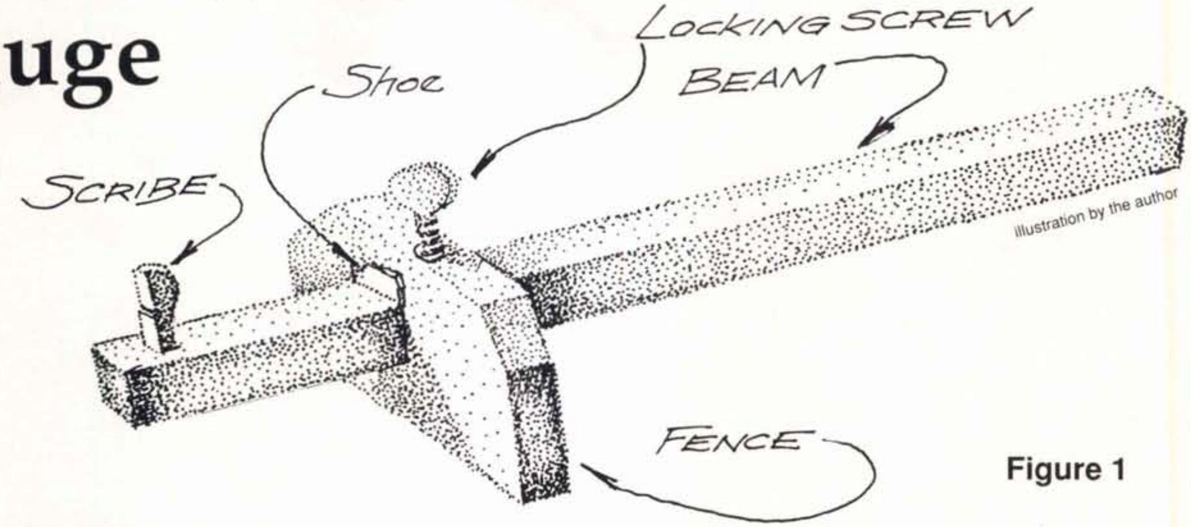


Figure 1

by J. Petrovich

Despite the Industrial Revolution, space flight and the micro chip, some tasks remain better done with the hand, the eye and a simple tool. When I have a series of dovetails to cut by hand, or need to locate and mark mortises and tenons or any of a dozen other jobs requiring multiple identical marks, I use the marking gauge. As you can see from Figure 1, it's a simple, accurate tool consisting of a beam, a lockable fence, and a scribe.

Fifty or sixty years ago, the typical cabinetmaker had an array of marking gauges. From long–beamed markers to short and somewhat delicate dovetail markers, each marking gauge fit a particular task (see "Tried and True: Gauges" Issue 42 April/May 1988). But back then, cabinetmakers made their own gauges. Now there is nothing magical nor sacred about old tools. There is nothing in their age that makes them perform any better than a tool made, say, this afternoon. Some of the old gauges that one sees at flea markets and garage sales are barely recognizable as marking gauges. Others are well engineered, ergonomically sound, and made by someone who obviously cared about the tool.

Point vs. Edge

Basically there are two types of marking gauges. One is used to mark *with* the grain and the other to mark *across* the grain. For marking with the grain, a point (as opposed to an edge) generally works best because it tends to wander less with the grain. The scribe should separate the grain rather than cut it. A point does this with the least resistance. The same point, however, is unsatisfactory for cross–grain work. A point tends to break rather than cut the fibers, and leaves a jagged mark. For cross–grain marking, a scribe that is shaped like a cutting edge produces a clear and useable mark. (A sharp chisel will align itself nicely in the mark when making the stop cuts for dovetails).

Because of the limitations of each gauge, marking gauges ought to be made as a set of two: one long–grain marker and one cross–grain marker.

Materials

The small amount of wood required gives use to some of those ubiquitous scraps of precious hardwood that always seem to accumulate in boxes, on shelf tops, or under the bench. In selecting the wood, the fence need not match the beam; nor do the gauges need to match one another. Probably the single most important criterion is hardness: maple, hickory, oak, rosewood, grenadillo or ebony are all satisfactory, as are any of a thousand others. Both components ought to be dry and stable so that the fit of the through mortise around the beam will stay snug.

The hardware requirements for the gauges are minimal. Each will need: a 1/4" × #20 thumbscrew, a threaded insert to mate with the thumbscrew, a piece of brass (copper or mild steel will do as well) for the shoe, a small carbon steel blade for the cross grain scribe (an old sabre saw blade ground carefully not to draw the temper works well, as do some X-acto™ blades), and for the

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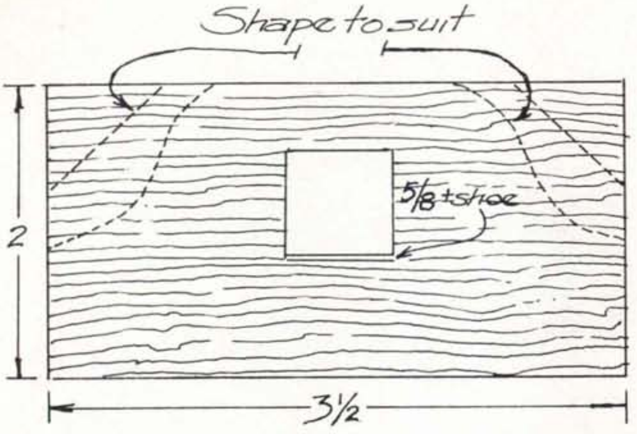
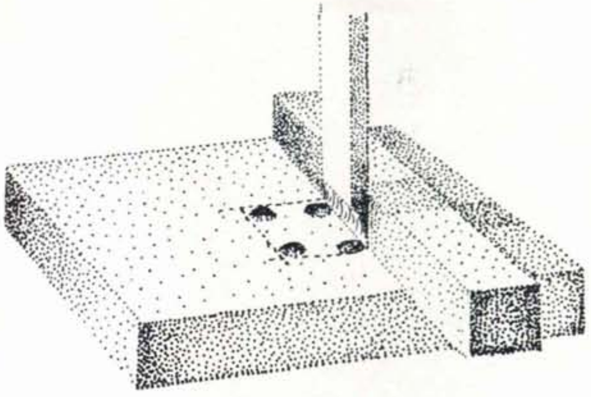
J. Petrovich *has been designing and building furniture for over 10 years. He also builds and designs tools, and teaches toolmaking on the college level. In his "spare time," he manages a hardwood lumberyard and mill.*

Figure 2



Pattern for the fence

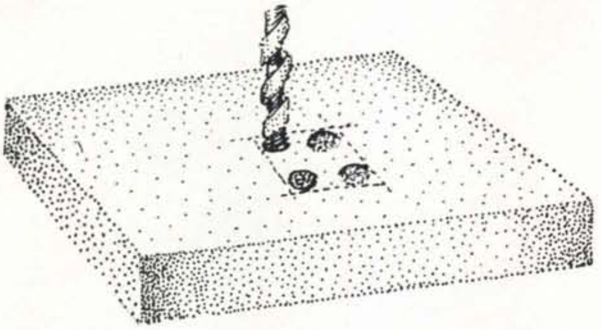
Figure 4



Use a steady guide when chiseling out the mortise.

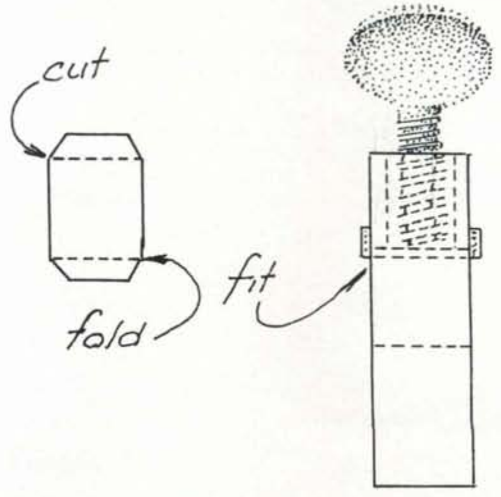
Drilling out the waste

Figure 3



The function of the shoe is to prevent the thumbscrew from marring the beam.

Figure 5



long-grain marker, a 1-1/2" piece of carbon steel rod, such as a broken drill bit of approximately 1/16" diameter.

Procedure

First cut the stock for the beam. Make it 10" to 12" long and 1/2" to 5/8" square. Next cut out the fence stock. Thickness is probably the most critical factor here. The stock needs to be thick enough to accept a threaded insert without splitting; a 1/4" × #20 insert requires about 1/2" of thickness for any regular success in seating it. With less thickness, or if the hole is not drilled straight, the fence will split. The fence stock ought to be about 2" wide by 3-1/2" long (see Figure 2).

Lay out the mortise for the beam. Be sure that you leave sufficient space for the threaded insert—approximately 3/8" inch. Allow sufficient space to fit the shoe as well.

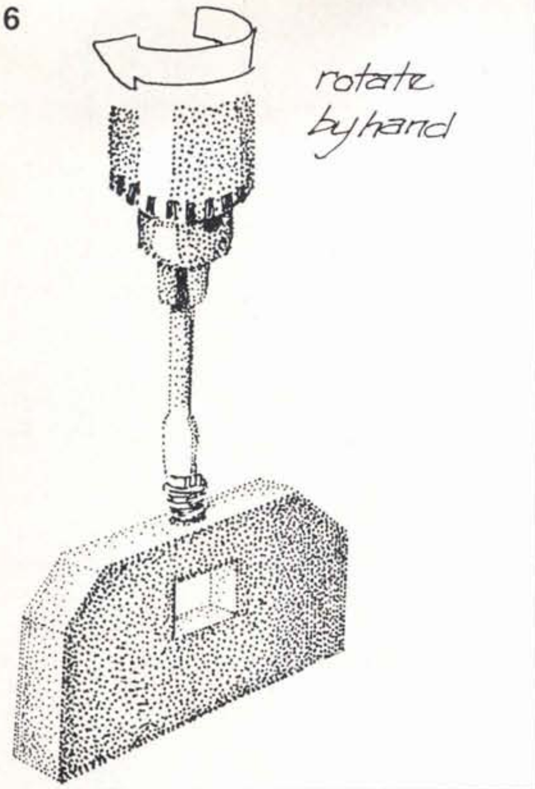
I prefer to drill out as much of the waste as I can before using the chisel for clean-up (see Figure 3). Be sure to stay shy of the full dimension of the beam when you cut the mortise. It is easier to use a sander or scraper to reduce the thickness of the beam than it is to reduce the size of the mortise. The sides of the mortise also need to be as true as possible. A steady guide (as shown in Figure 4) helps considerably. Once the mortise is near to fitting the beam, very carefully reduce the beam so that it slides in smoothly.

The function of the shoe is to prevent the thumbscrew from marring the beam. Use a 1" square piece of 12 to 14-gauge sheet metal and trim the corners, then fit it in place as shown in Figure 5.

Locating and seating the threaded insert requires patience. If your inserts came without an indication of the correct hole size, experiment in a piece of similar scrap wood. (Note: not all 1/4" × #20 inserts require the same hole size. It is, to say the least, disappointing to ruin a perfect beam and fence fit, so it is worthwhile to experiment.)

After drilling the hole, I use the drill press to seat the insert.

Figure 6



Using the drill press to seat the insert

The blade and wedge inserted in the mortise of a cross–grain marker

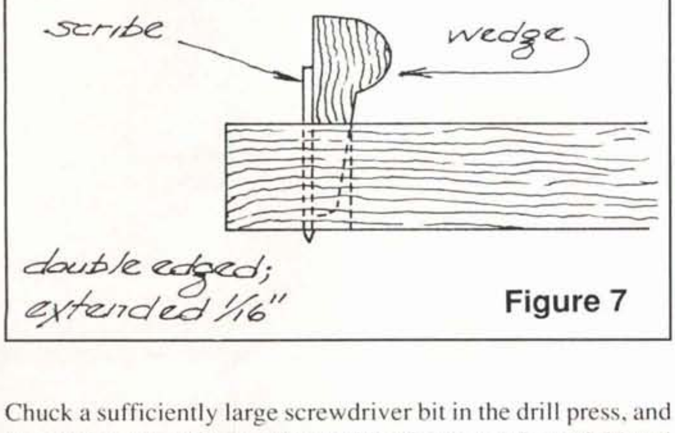
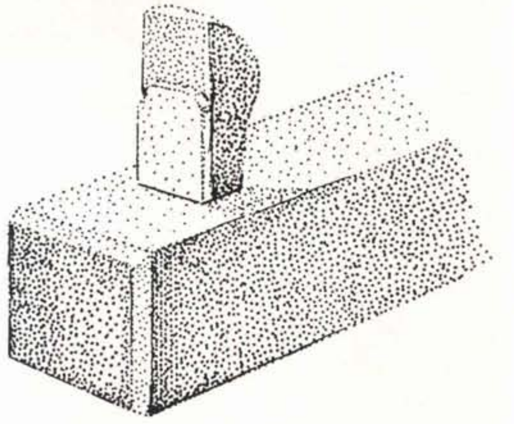


Figure 7

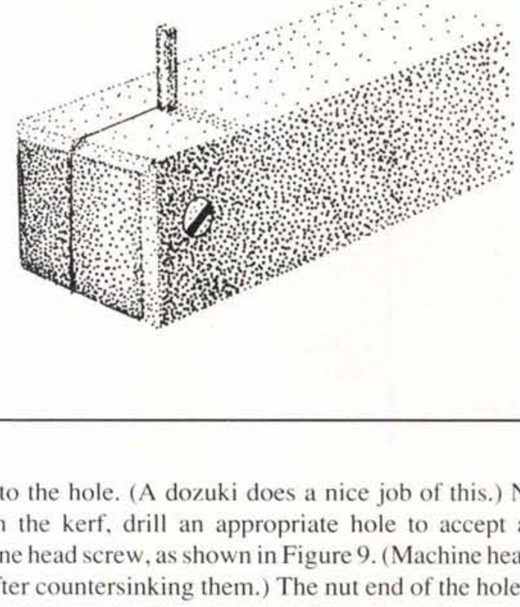
Figure 8



A cross–grain marker

A long–grain marker with kerf and machine screw

Figure 9



illustrations by the author

Chuck a sufficiently large screwdriver bit in the drill press, and secure the gauge fence with a table vise or a substantial hand screw. This setup will aid in alignment and minimize damage to the driver slot. Rotate the chuck by hand slowly as you maintain a steady pressure with the drill press (see Figure 6). If, as you near the end of seating the insert, some of the wood fibers start to lift and crack from the fence, stop. If you have more than half of the insert seated, there are probably enough threads to hold the thumbscrew so don't go any further. You can file and sand the insert flush with the top.

With the beam and shoe fitted to the mortised fence, all that remains is to cut the mortise for the scribe. If you are making a cross–grain marker, drill and square the hole to fit your blade and a wedge as in Figures 7 and 8. Locate the mortise no closer than 3/8" from the end of the beam.

If you are making a long–grain marker, drill a hole just large enough to accept the scribe. Cut a thin kerf from the end of the beam to the hole. (A dozuki does a nice job of this.) Now, to tighten the kerf, drill an appropriate hole to accept a small machine head screw, as shown in Figure 9. (Machine heads look tidy after countersinking them.) The nut end of the hole should have a shallow mortise to accept the nut—again a matter of tidiness. If the machine screw seems to be a lot of work for a questionable convenience, you may want to drill the hole a bit smaller and just rely on friction to hold the scribe. (I have used one that is made this way for about ten years and the scribe is still solid in the beam.)

Using the Marking Gauge

Because of the natural articulation of our hand and wrist, the marking gauge works best if pushed away from the body. There is better control and the gauge is much less likely to wobble. Keep the scribe sharp and close in to the beam. A sharp scribe cuts cleanly and by having the scribe extended less than 1/16", you reduce the gauge's tendency to pivot. **PW**

Octagonal Frames

by Tom Crabb

The major difficulty in making an octagonal frame is not so much cutting the joints, but getting eight loose pieces of wood in their proper places at the same time and keeping them there while clamping. With this method of making frames (of any number of sides) you only have to deal with one piece of wood. It is a variation of kerf bending, a technique in which cuts are made on the inside surface of a piece of wood to allow it to bend.

The hardest part of this method is the layout; it must be done with great care. Start with a strip of oak (preferably white) that is the thickness and width desired. These dimensions can be just about anything you wish, since you will only be bending 1/16" or less. The length of the piece, however, is a little more difficult to figure. In making any frame with an even number of sides, the distance between the parallels is the dimension to begin with. Since octagonal frames are the most popular, and since frames with an even number of sides work the same, I'll use the eight–sided frame for purposes of illustration.

To make a frame of a given inside dimension, divide the inside distance by two and draw a circle using that number as the radius. Using a framing square, lay off four square sides tangent to the circle. Now, mark off the corners of the square at 45° and tangent to the circle. This little drawing will give you the inside length of each segment of the octagon for a given width between parallels. The drawing can be done to any convenient scale, 1/2" to 1," 1/4" to 1," etc. To find the total length of stock multiply the inside length of the segments by 8 and add the width of the stock times 8.

Starting with the oak cut to thickness, width and length and well sanded, lay out

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***Tom Crabb** learned woodworking as a boatbuilder. He is the author of* Making Wood Boxes With a Band Saw, *and* Band Saw Projects *(Sterling Publishing Co.).*

photo by the author

The face of this frame was spray–painted flat black, then the edges were chamfered 1/8".

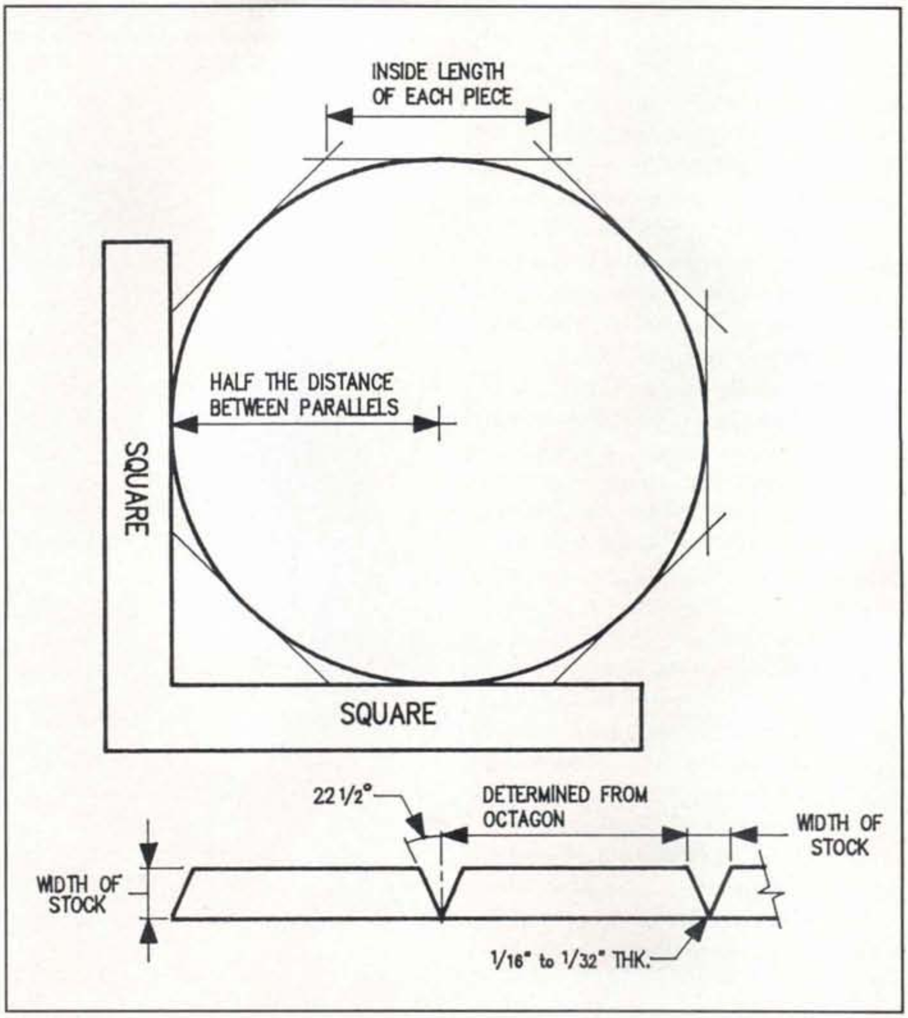
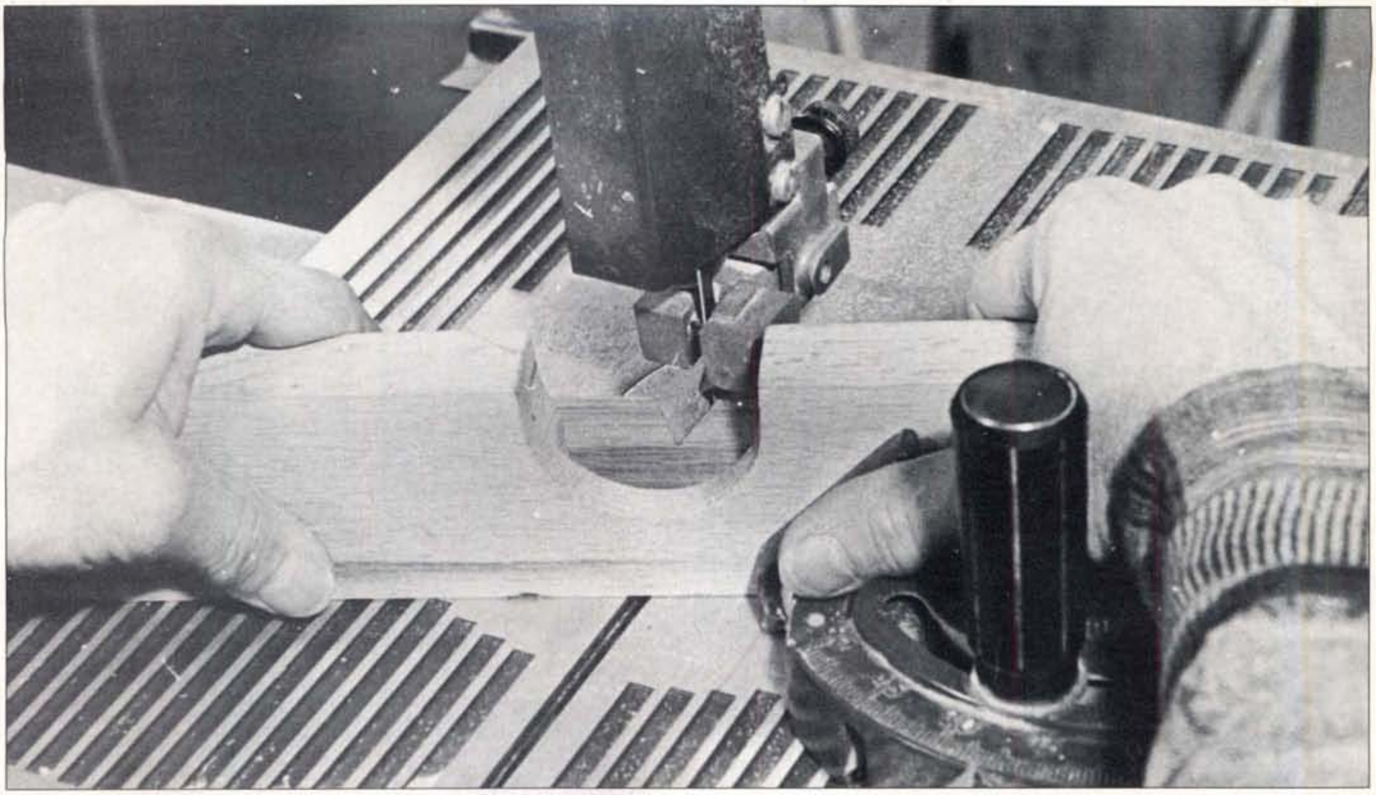


illustration by Tom Larson



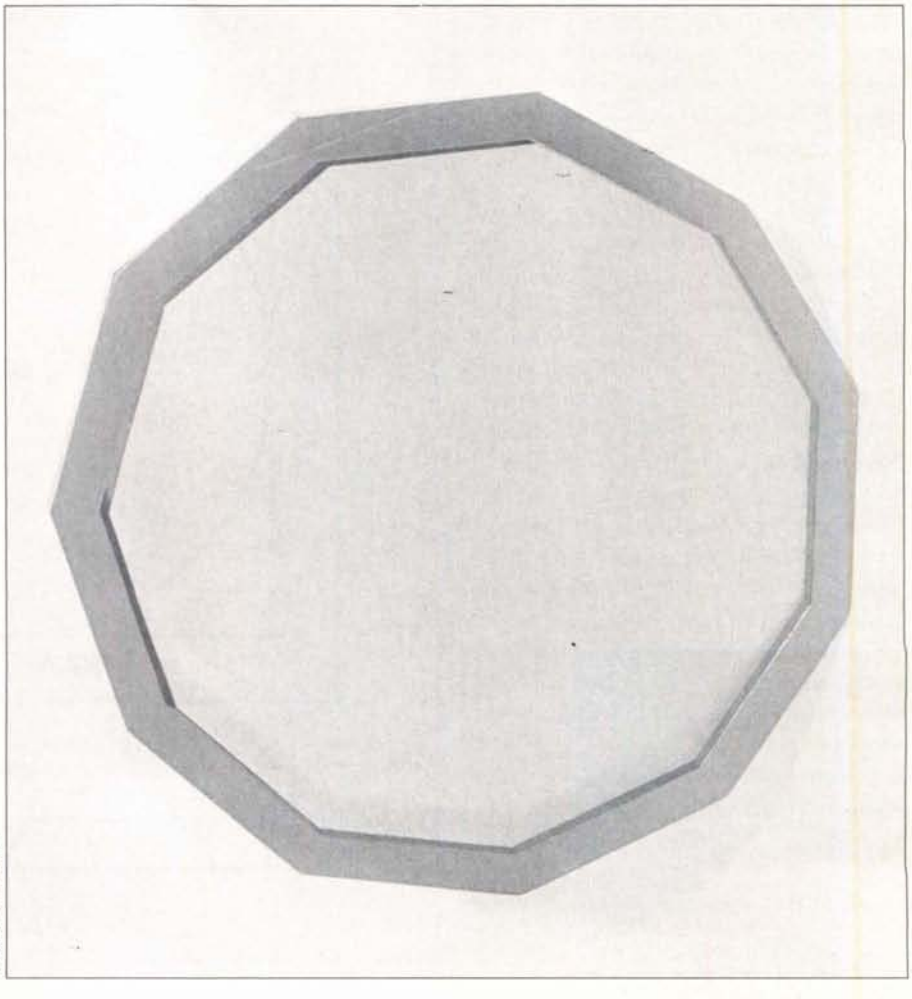
Make this auxiliary fence so the wood can be supported on both sides of the notch. Leave about 1/16" of material beyond the point of the V.

the cutting pattern on both sides. Start by marking a 22-1/2° angle on one end, then mark your inside length, then back–to–back 22-1/2° marks, then another inside length, and so on. Sawing out the notches is best done on the band saw. Attach a long board to the miter gauge fence so the workpiece can be held firmly on both sides of the blade for a more accurate cut.

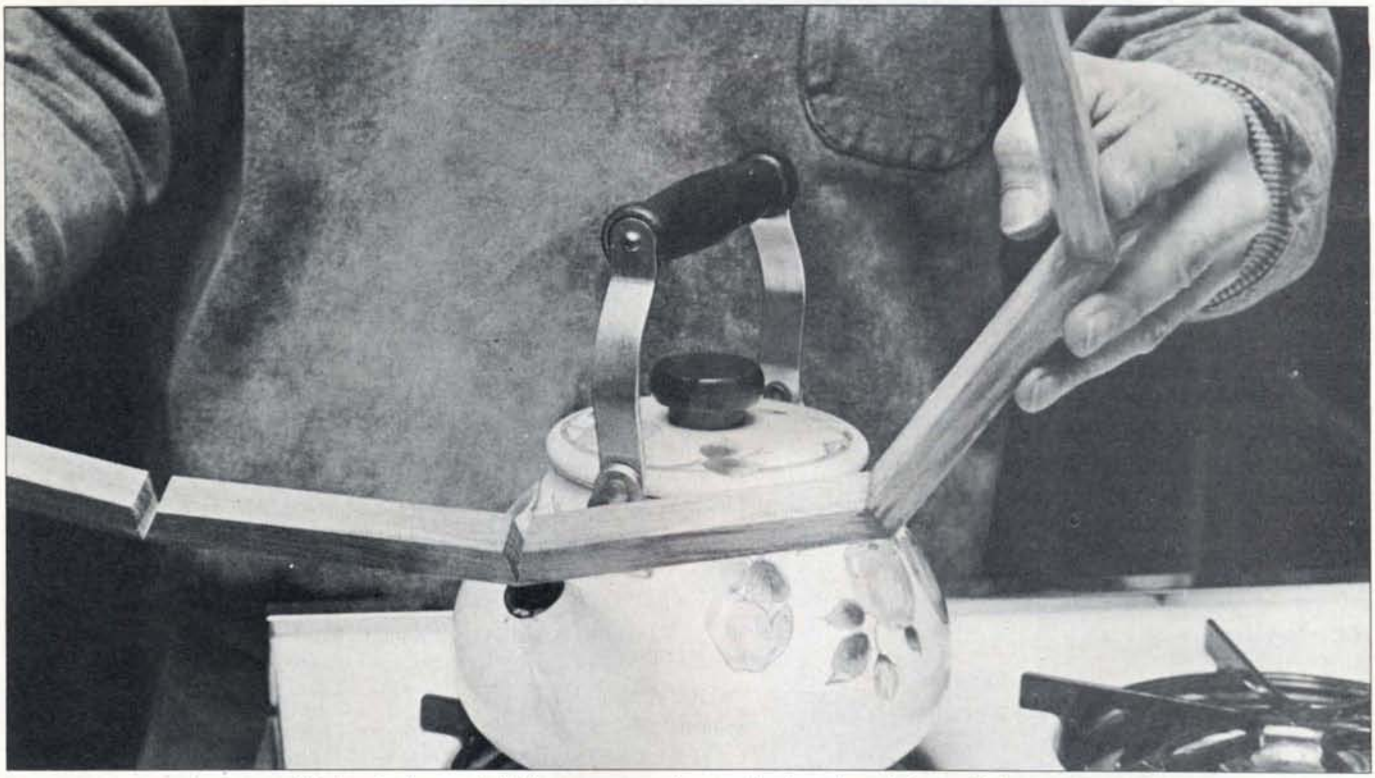
The best method for setting the 22-1/2° on the saw is to square a line from the edge of a workbench or other flat surface and, using a protractor, mark off 22-1/2° from the vertical line. With a straightedge, draw a line from the 22-1/2° mark to the intersection of the vertical line and the workbench. Position the miter gauge upside down with the fence against the workbench edge, swing the bar over to the mark and tighten the knob. Saw the angle on a piece of scrap and check it before sawing into your oak. Saw out the notches with the miter gauge at one setting by flipping the piece for every cut. Leave 1/16" to 1/32" of stock uncut at the junction of these V–cuts.

With all the notches sawn out, it's time for the steam. The trick here is not to bend the wood before it's ready. Steam each notch one at a time over a tea kettle. Apply

Frames of any number of sides can be built; the angle needed is found by dividing 360° by the number of sides, then dividing that number by two. An 11–sided frame is pictured here.

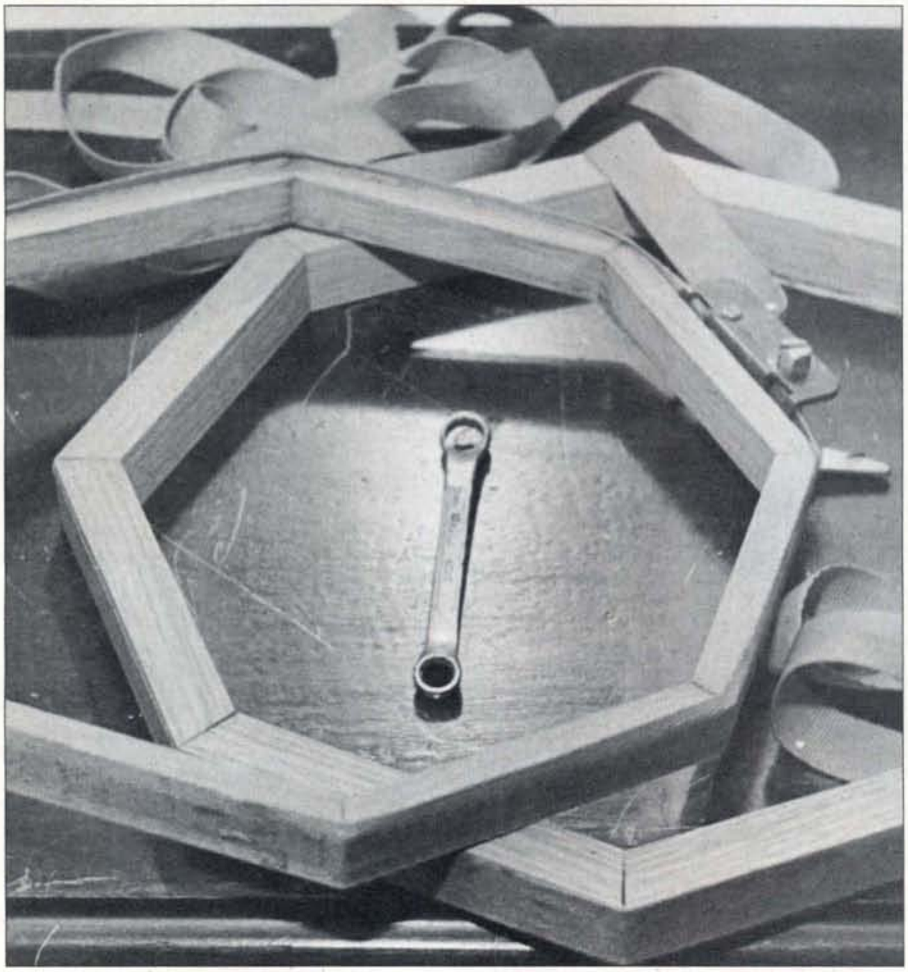


photos by the author



To bend a frame, hold it over a steaming tea kettle and apply just a little pressure until the wood bends of its own accord.

When all the joints are closed, use a web clamp to hold the shape until the wood is dry; then glue and clamp again.



just a little pressure until it bends of its own accord. If you rush it, little fibers will break loose on the outside of the bend. This doesn't destroy the project, but it will mean a lot more sanding and/or filler.

After all the notches have been steamed and bent, place the frame in a web clamp and allow it to dry. Once dry, remove and open the clamp and the joints enough to put in a little glue, then clamp again. At this point it is a good idea to measure between parallels to make sure the frame is square. If the frame is a little out of square, a bar clamp can be used diagonally across the frame to pull it square.

The next step, after the glue has set, is to cut the rabbet in the back side of the frame. This should be a 1/4" × 1/4" rabbet which is best cut on a router table. I have tried cutting the rabbet in the stock before notching and bending, but it doesn't work well.

After the rabbet comes any decoration you wish to give to the facing edge of the frame. This can be simply nosed–off edges, or a chamfered edge (as in the frame on the drawing of the African woman). Try to make the edge detail and the finish of the frame relate in some way to what you are framing. PW

Focus on Carving

CARVING A

by William H. McMaster

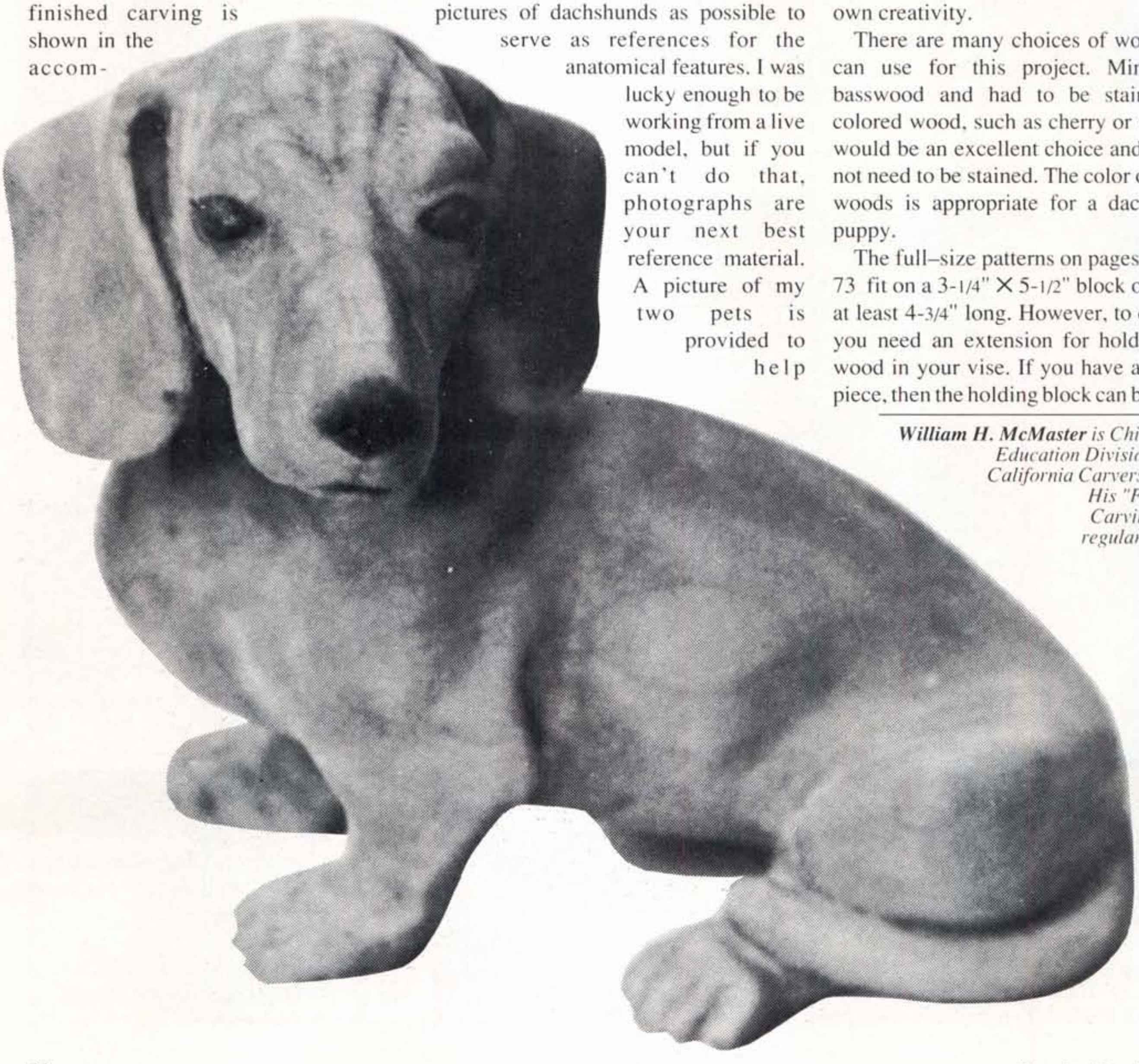
Pets add a lot to our quality of life, and most of us have had a pet sometime. Creating a carving of your pet can be a very rewarding experience. The subject of this carving was of one of my two dachshunds when he was a puppy. The finished carving is shown in the accompanying photograph. This carving has received many compliments and requests for patterns at Guild shows, so I want to share its pattern with you and give some guidelines for the carving.

This is an in–the–round carving done in a realistic manner. Assemble as many pictures of dachshunds as possible to serve as references for the anatomical features. I was lucky enough to be working from a live model, but if you can't do that, photographs are your next best reference material. A picture of my two pets is provided to help you visualize some of the essential features that will add character to your carving.

Use this pattern as a starting point. Beginners can do a copy, but more experienced carvers should make design adjustments to the pose to reflect their own creativity.

There are many choices of wood you can use for this project. Mine was basswood and had to be stained. A colored wood, such as cherry or walnut, would be an excellent choice and would not need to be stained. The color of these woods is appropriate for a dachshund puppy.

The full–size patterns on pages 72 and 73 fit on a 3-1/4" × 5-1/2" block of wood at least 4-3/4" long. However, to carve it you need an extension for holding the wood in your vise. If you have a longer piece, then the holding block can be of the



***William H. McMaster** is Chief of the Education Division of the California Carvers' Guild. His "Focus on Carving" is a regular feature in* PW.

Dachshund Puppy

same wood; otherwise, you will have to add a temporary one. This holding block should be located underneath the hind quarters, as shown in Figure 1, and be long enough to give you easy access to the carving regions. When mounting the holding block, glue pieces of newspaper to both the top of the holding block and the bottom of the carving block (after it has been bandsawed) with ordinary white glue. After these have dried, glue the two together. When the carving has been finished, you can easily break them apart at this joint with a chisel and a mallet. If you are using a harder wood than basswood, you may want to reinforce this bond with a screw. This will give extra support to withstand the force required for carving.

The first step, of course, is to make a clay model. The methods for doing this were discussed in Issue 43 of *Popular Woodworking* (June/July 1988). In sculpting this clay model you get the feel for how the three–dimensional carving will look. You can make the changes that reflect your own personal artistic interpretation of the subject. For this model I used Roma Plastilina #1 clay and because of the dog's size and shape, it was not necessary to use an armature for support. The amount of time spent making a clay model is more than made up during the carving because you already "know" what you are doing.

Trace each of the four main patterns onto pieces of clear acetate using a permanent marker pen. These will be your check patterns. Use them to accurately place the features as you carve them. They are more effective than trying to do everything by eye.

As always, the approach is to first remove the wood that obviously doesn't belong, establishing the major regions

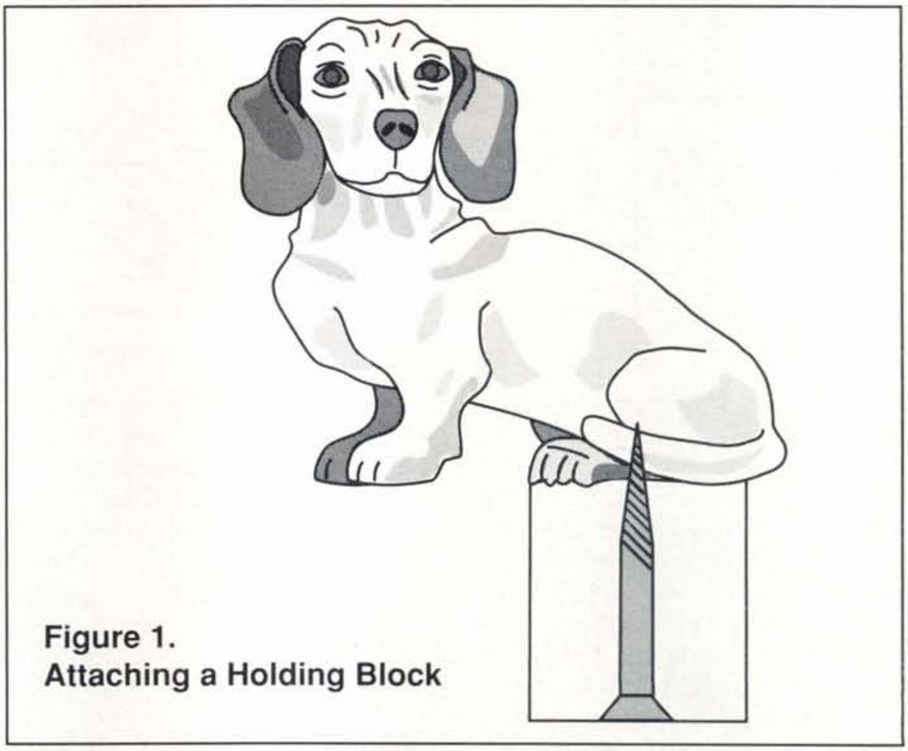
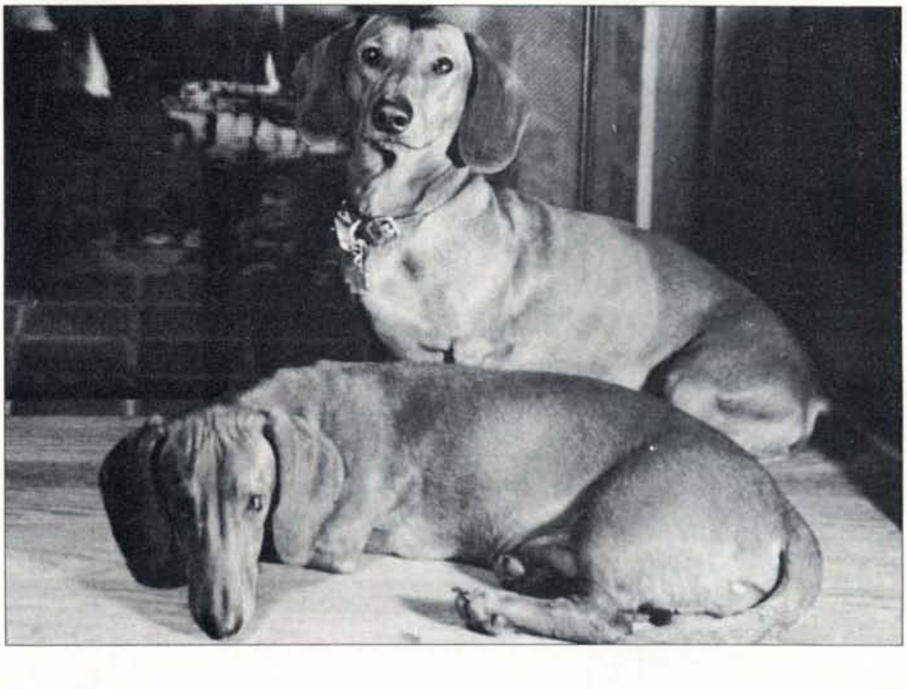
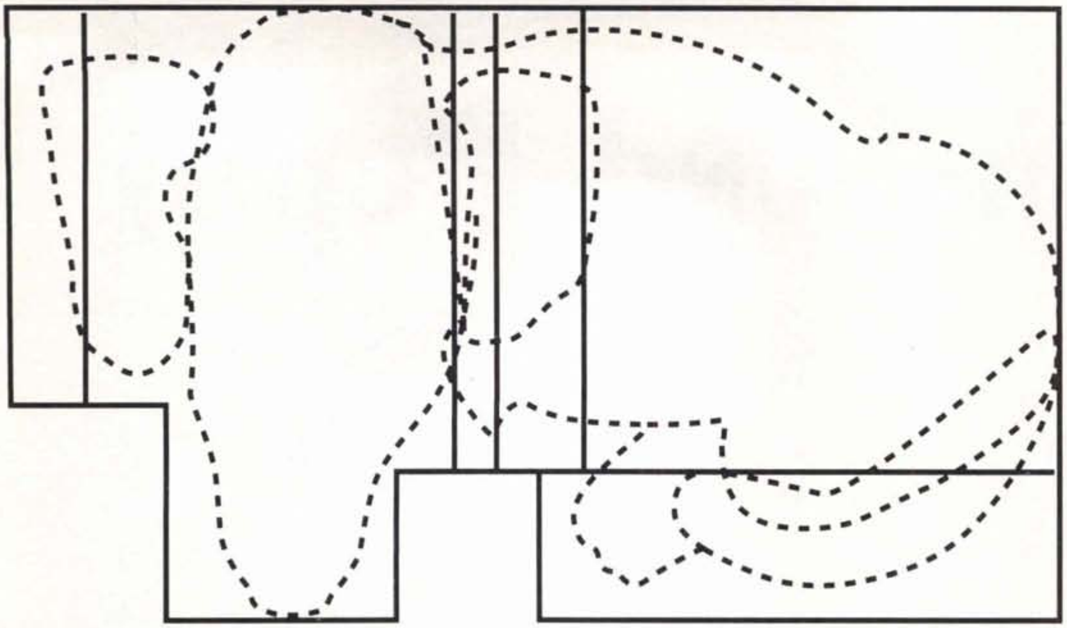


Figure 1.
Attaching a Holding Block



photos and illustrations by the author

Figure 2. Top View of Cutout

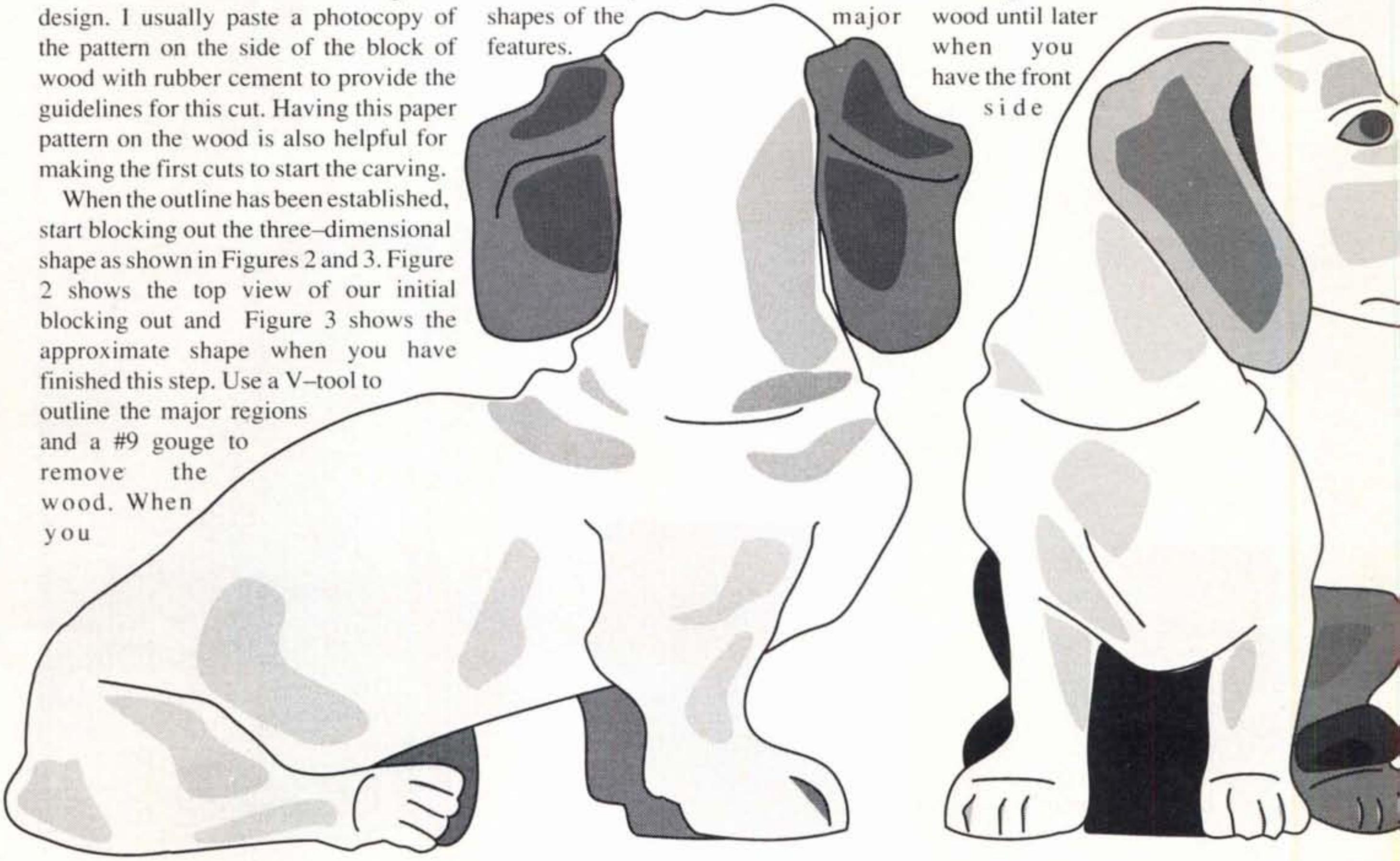


illustrations by the author

and slowly working toward the details. Start by bandsawing a crude outline of the front side view of the pattern. Be sure to leave extra wood around the edges to allow for errors and minor changes in design. I usually paste a photocopy of the pattern on the side of the block of wood with rubber cement to provide the guidelines for this cut. Having this paper pattern on the wood is also helpful for making the first cuts to start the carving.

When the outline has been established, start blocking out the three–dimensional shape as shown in Figures 2 and 3. Figure 2 shows the top view of our initial blocking out and Figure 3 shows the approximate shape when you have finished this step. Use a V–tool to outline the major regions and a #9 gouge to remove the wood. When you approach the final shape you can smooth it somewhat with the #3 gouge. This will then allow you to mark the pattern lines on the wood for your next series of cuts.

From this point, start to define the shapes of the major features. Block out the ears by establishing the forward slope as shown in the front end view pattern. Do the front side of the ear first to establish the main form. When boasting out the back side, leave plenty of wood until later when you have the front side



fully formed. Always shape the main surface first and then you can adapt the secondary surface to conform to the cuts you have already made.

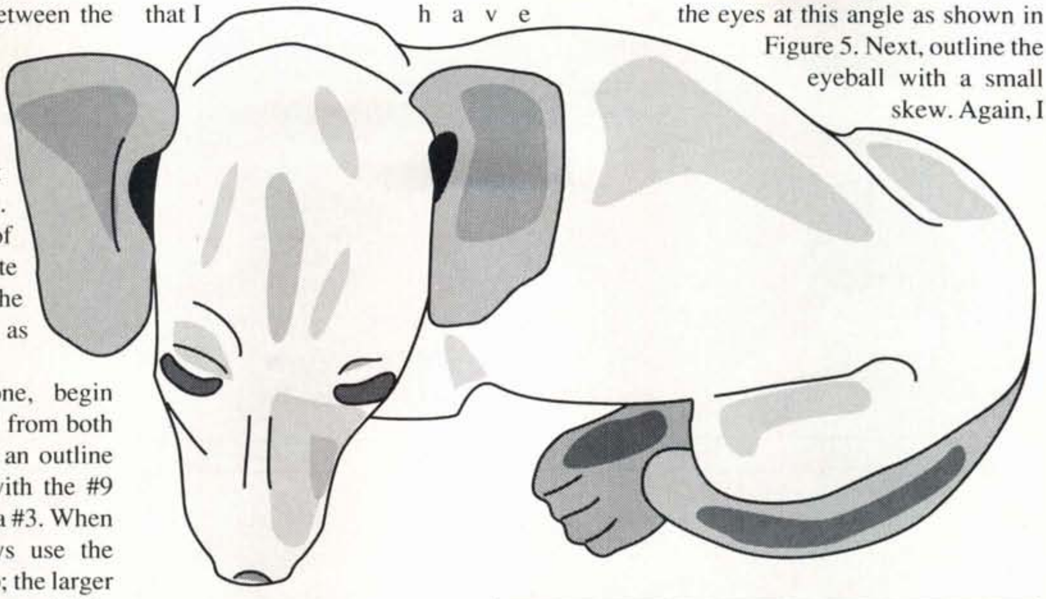
Since we are now working from the front view, open the space between the legs next—again leaving excess wood because the outer side of the legs must be formed first to guarantee that we will have enough wood left to properly form their shapes. Next establish the position of the rear legs. To help you locate these legs, Figure 4 shows the bottom outline of the carving as viewed from below.

When this has been done, begin forming the back legs and tail from both sides of the body. Start with an outline using the V–tool, boasting with the #9 gouge, and then shaping with a #3. When using the #3 gouges, always use the largest tool that will do the job; the larger the tool, the smoother the cut. While working on the body, define the breast–bone as shown in the front side view pattern. This is another distinguishing feature of the dachshund's profile.

Next start forming the head as shown in Figure 5. This is the most important part of the carving since it establishes the character of your puppy. First shape the muzzle using the top view to establish the width, then use the front end view to carve the profile of the head. The initial cuts are shown in the figure.

When the basic forms have been carved, it is time to start on the details. Here is where a live model or a series of photographs are very important. The photographs do not have to be the same pose you are carving; they are used just to find the predominant features and see how they are formed. For example, a dachshund has many folds in his skin, and it is the carving of these features that adds life to the carving. Study the two dogs in the photograph to see these wrinkles. Their main regions are at the top of the head and on the back where the neck joins the body. These must play a prominent role on your carving, even to the point of overemphasizing them, if need be, to establish the shadow patterns that are so necessary in a carving. To start these wrinkles, use a small U–tool to establish the furrows and small #3 gouges to form their shapes. When using these small #3 gouges for detailing, I find the ones mounted in dowel rods to be the most effective. They give me the same control that I have while drawing with a pencil.

In carving the eyes, it is important to establish the correct "set" (the angle of the plane) of the eyes. For the dachshund, this is about 40°; so carve a plane in front of the eyes at this angle as shown in Figure 5. Next, outline the eyeball with a small skew. Again, I



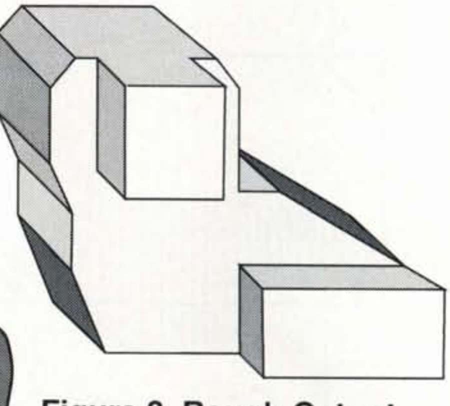
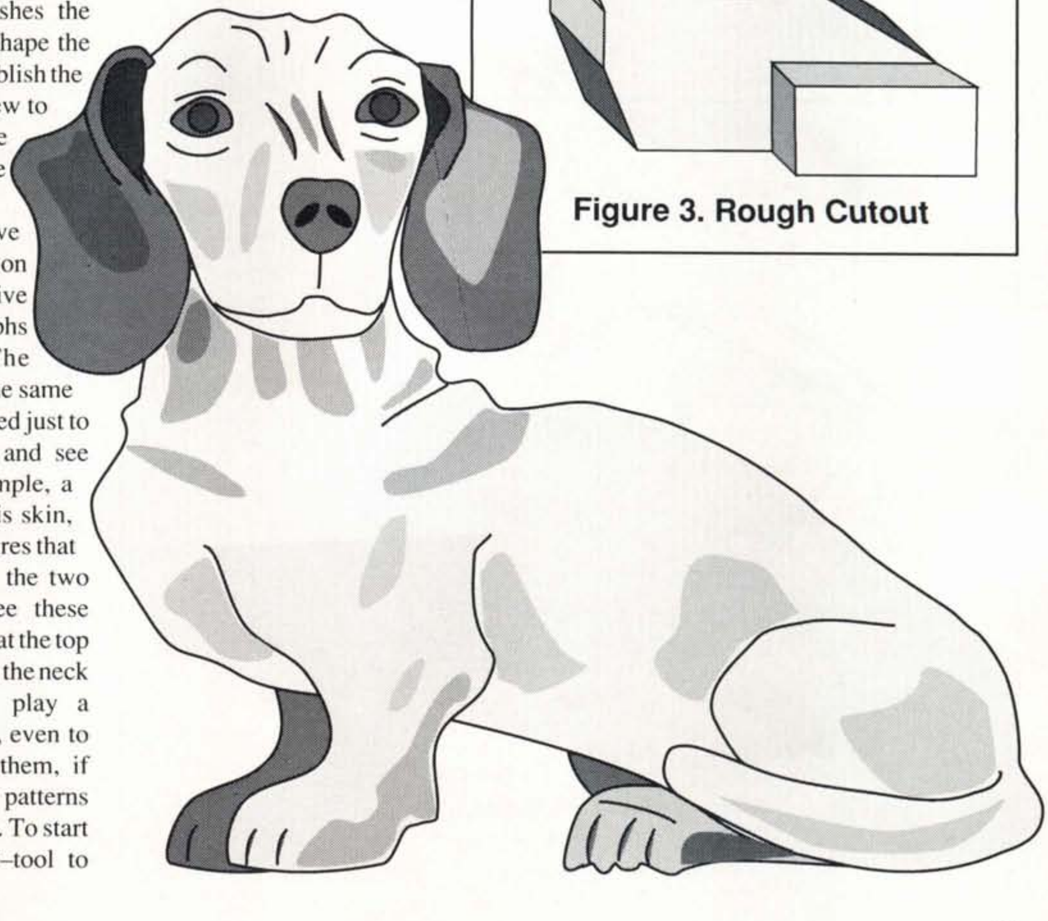


Figure 3. Rough Cutout

Full–Size Pattern



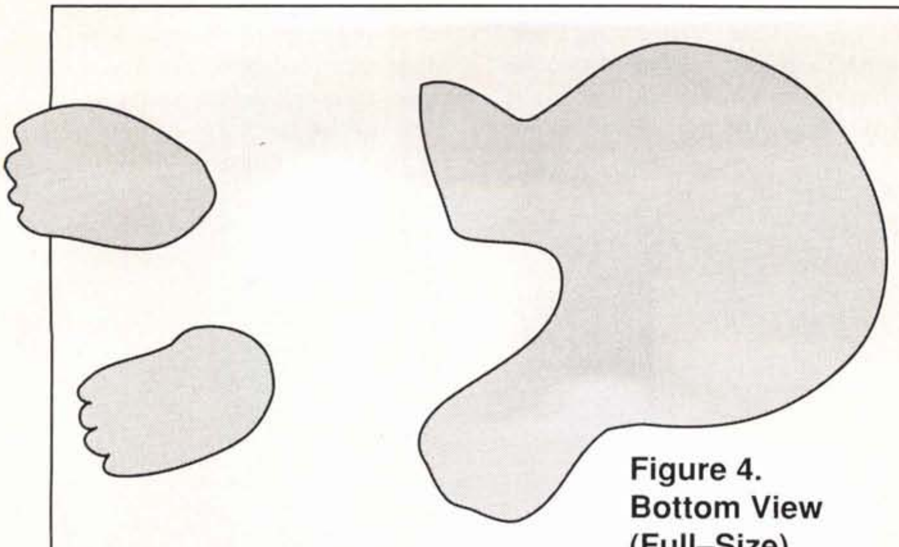


Figure 4.
Bottom View
(Full–Size)

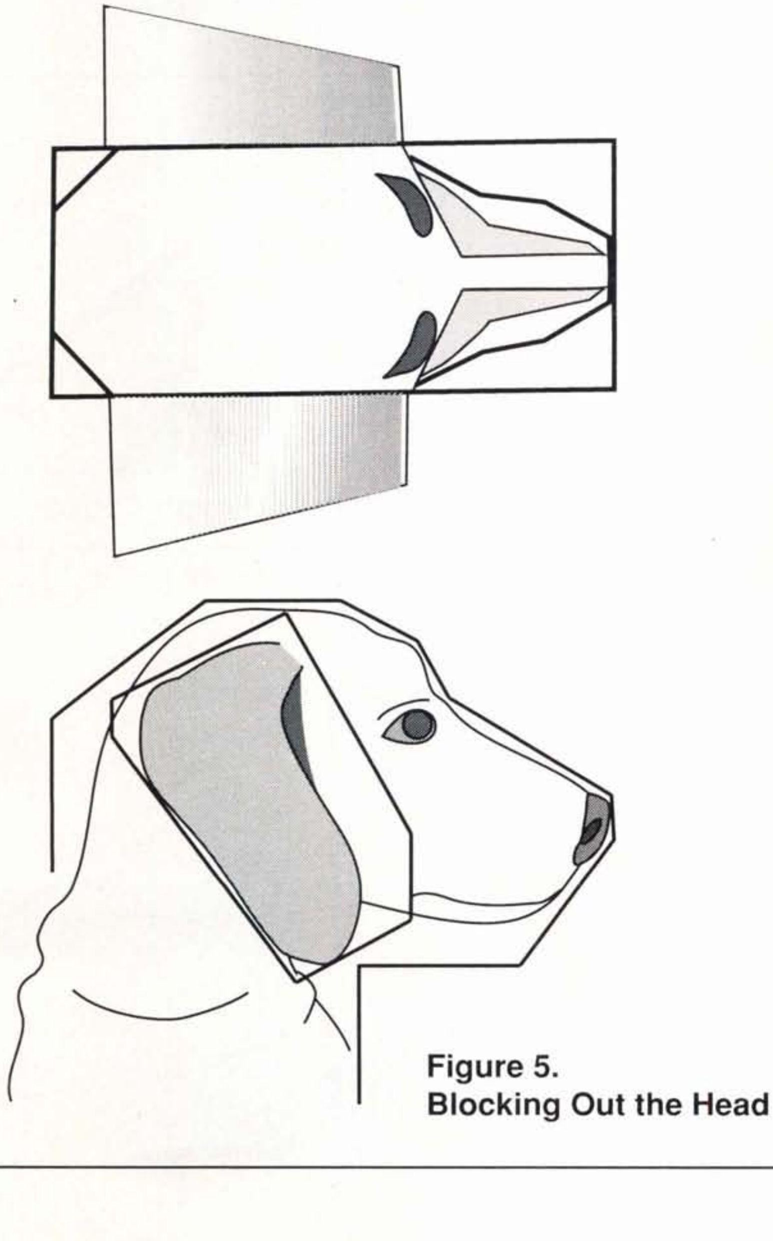


Figure 5.
Blocking Out the Head

illustrations by the author

find that one mounted in a dowel rod gives the best control. When the eye has been outlined, use your skew to remove two triangular chips—one at each corner of the eye. Then spherize the eyeball. When the eyeball has been formed, you can carve the eyebrows and the lid formation under the eye.

For the dog's body you have the choice of carving the fur or not. I planned on using the staining technique explained later, so no fur was carved on my version. If you decide to carve the fur, first study the hair patterns from your photographs. You want your cuts to follow these lines to give a realistic impression.

Since my dachshund was carved in basswood, it needed to be stained. You have to be careful with the staining of basswood because of its soft texture and the different absorptions relative to the grain. I paint on a stain made from boiled linseed oil and artists' raw sienna oil paint (I used Grumbacher brand). Be careful that the pigment is thoroughly mixed with the linseed oil before you apply it. Use plenty of oil to make a wash, and experiment on a scrap piece of wood before you apply it to your carving. If you need a darker color, you can apply additional coats. Apply the mixture to the raw wood and you will find that it soaks up equally well on the end grain as it does elsewhere.

When the turpentine penetrates into the wood it raises the grain. You can stop here, as I did, for it gives the wood a soft look very much as the short hair on the real dog does. Otherwise, rub the fuzz off with #0000 steel wool and apply a protective coat of varnish. I like McCloskey's Heirloom Clear Varnish #0007 Deep Flat for the final protective coat on carvings such as this. If you prefer a little more sheen, mix in some of McCloskey's Eggshell #0032 varnish with the Deep Flat. I have used up to a 50–50 mixture on various carvings.

You now have a charming carving of a little dachshund puppy which can bring you joy whenever you look at it. In my case it brings back fond memories of the happy times I had with my loving friend. PW

Wooden Hammer

by John A. Nelson

The wooden hammer is an extremely handy tool in any wood shop. Use it at times when a metal hammer would damage your project by leaving unsightly marks. It makes a good tool to help force very stubborn, tight–fitting joints together.

The hammer is made from two pieces of hardwood, one piece that is 3" in diameter by about 6" long, the other, 1-1/4" diameter by about 12" long. The extra length is for mounting it on the lathe. Locate the exact center of each end and prick–punch this point with a small nail set. Set a table saw blade at 45° and trim off the corners so you end up with an eight–sided block.

Both pieces are made the same way: Mount the block on your lathe and, using a gouge, round to the largest diameter along the entire length. Locate and mark the ends by cutting in slightly with the parting tool. Mark off the locations of the various diameters shown in the drawing.

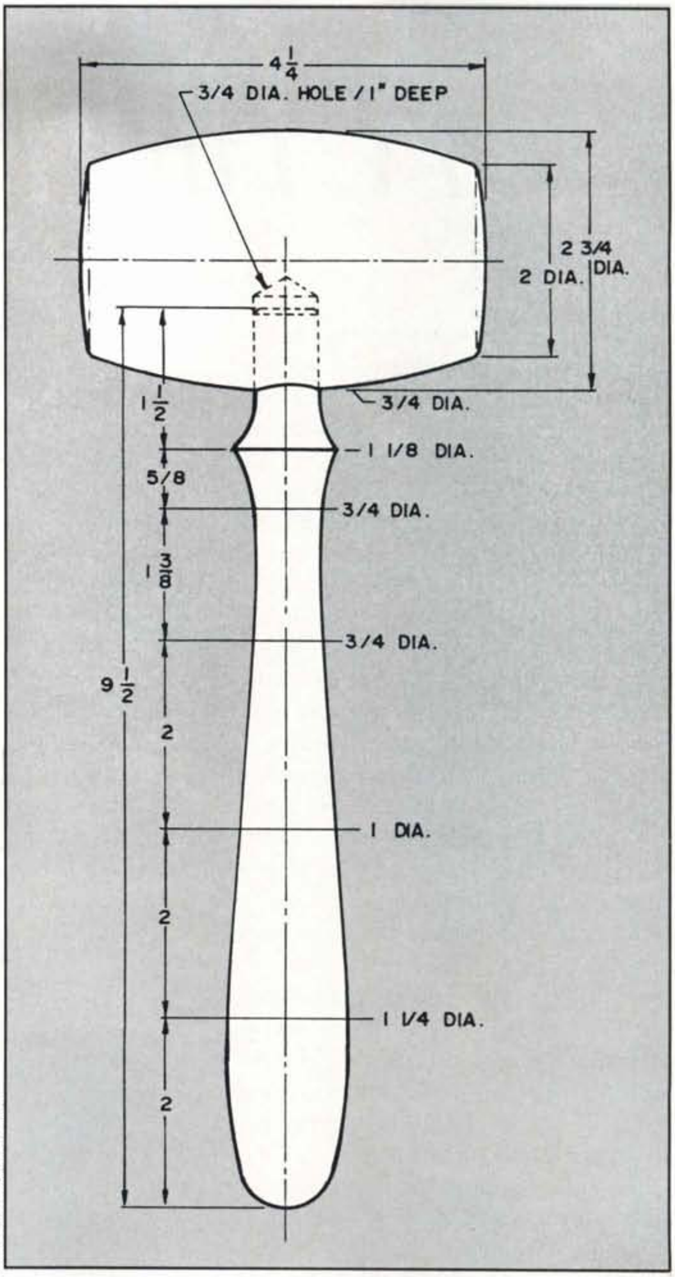
Smooth to size, and sand all over to a fine finish. Take care to maintain the 3/4" diameter on the head end of the handle. Cut the pieces off using the parting tool.

Using a V–block, drill a 3/4" diameter hole (or one that will make a snug fit over the handle) 1" deep in the hammer head. If you don't get a snug fit, you can make a saw kerf in the end of the 3/4" section of the handle and add a thin wedge.

Apply glue to the handle and inside the hole in the head. Don't use too much or you could split the head when you add the handle. Allow the glue to set before using.

Finish with a penetrating oil and your hammer is now ready for years of hard use.

John A. Nelson *is the author of numerous books on woodworking and is a contributing editor for* Popular Woodworking.



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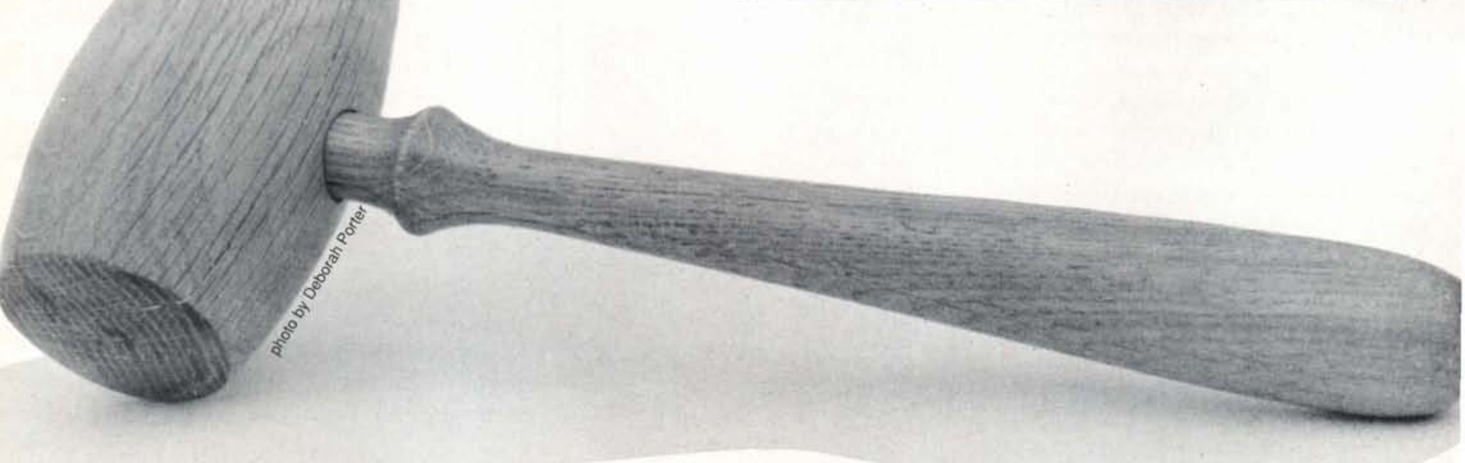


photo by Deborah Porter

A Popular Woodworking Project

A Tilting Mirror

by Jim Stiak

Take a good look at yourself—in this tilting mirror you'll be able to see from the crown of your hat to the tips of your toes, even if you're the center for a basketball team. Eleven pieces of wood, a few screws and bolts, and one mirror are all that's needed to create this handsome and portable tailor's tool.

The Frame

The mirror is encased in a simple rectangle of 1-3/4" stock. To begin, cut the frame members (A and B) to size. Pick the best sides as the fronts, and rout both front edges of the frames (uprights) with a 1/4" round–over bit. In the exact center of one edge of each of these pieces, drill a 3/8" hole about 1" deep. These holes, which will accept the T–nuts, must be placed precisely or you'll wind up with a cockeyed mirror, so measure them from the same end. You may want to counterbore a larger hole so that you can sink the T–nuts out of sight. When you put the frame together, these holes go on the outside. With the frames butting into the stiles, insert the dowels and glue and clamp the frame together.

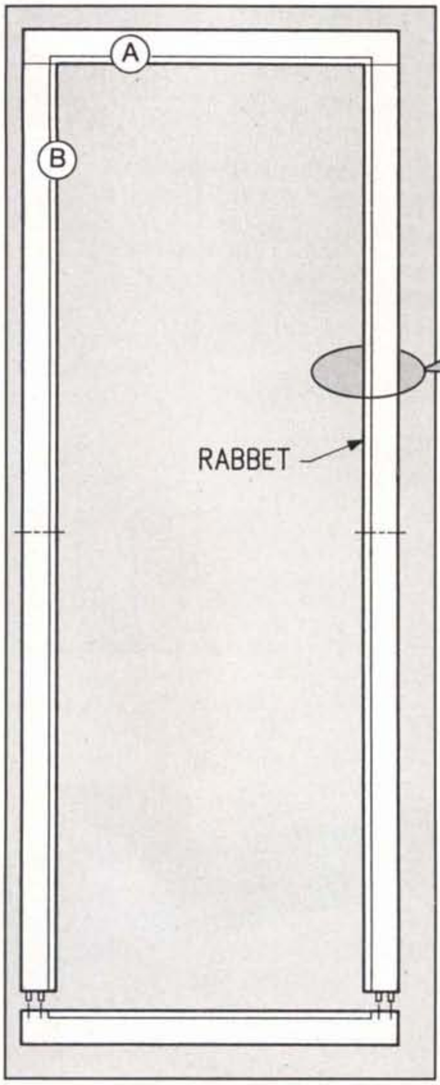
Once the frame is set, finish routing both the inside and outside edges with the 1/4" round–over. Rout the stiles first, to avoid splitting the corners. On the back of the frame, rout a 3/16" deep × 3/8" wide rabbet on the inside edge to accept the mirror. Using a sharp chisel, square off the four corners of this channel. Sand and finish the frame, then press the T–nuts into their holes. A little epoxy will help ensure the longevity of this connection.

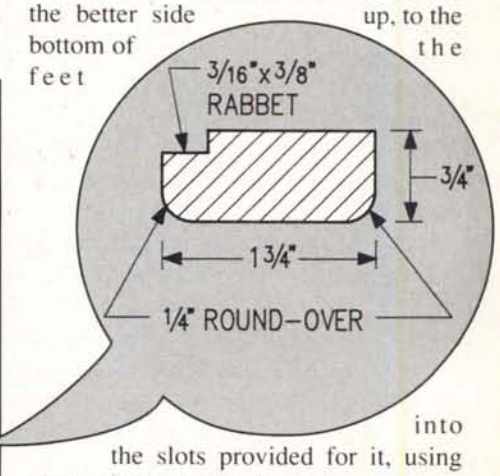
With the frame lying on its front, carefully place the mirror in it. Place the plywood back (C) over it and attach it to the frame with 1" wood screws. Depending on the tools you have, you may want to bevel the back edge of the plywood and frame, or just sand it well.

The Stand

The legs (D) will need dadoes cut on their inside surfaces for the feet (E), and on the backs for the back brace (F). On the inside surfaces, cut a 3/4" deep × 2-5/8" wide dado that starts 1" from the bottom. On what will be the back edge, cut a dado that is 3/4" deep and 1-3/4" wide and starts 26" from the bottom. Drill a 1/4" hole located 29-3/4" on center in each for the bolts that will hold the mirror. Round the top ends of the legs in a manner that pleases you.

Cut the feet (E) as shown in the drawing. Attach the cross brace (G), with the better side up, to the bottom of the feet into the slots provided for it, using glue and two screws for each.



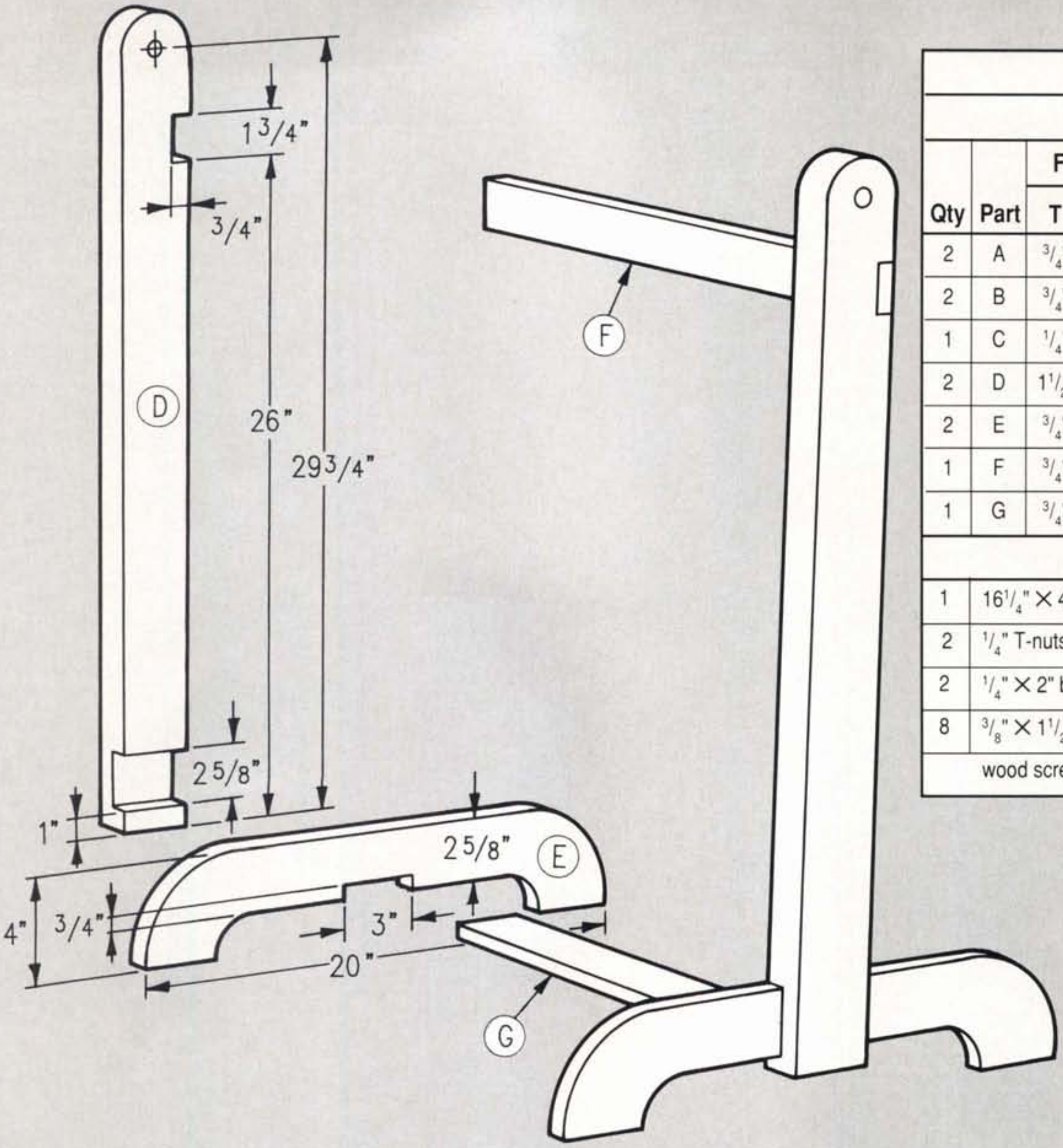


Fit the legs over the feet/cross brace assembly, and glue and screw these together using 1-1/4" wood screws driven from the inside. Now, making sure the distance between these pieces is a consistent 19-1/8", fit the back brace (F) into its dado and attach it with glue and screws.

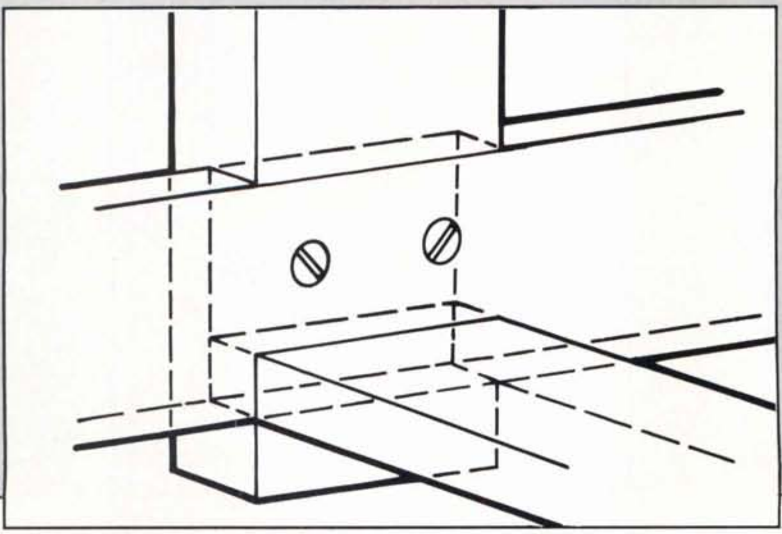
Together At Last

Now's the time to finish both the stand and the frame with your favorite oil or varnish. I used tung oil on mine. Placing the mirror into the stand is considerably easier with two people. Screw the bolts through the holes and into the T–nuts, tight enough to keep the mirror from swiveling on its own, but not so tight that you can't easily swivel it yourself. Now, stand back and admire your work. Oh, and check and make sure you've got all the sawdust off the back of your pants.

***Jim Stiak** is a woodworker from Eugene, Oregon.*



Tilting Mirror					
Cutting List					
		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
2	A	3/4"	1 3/4"	19"	frame rails
2	B	3/4"	1 3/4"	48"	frame stiles
1	C	1/4"	18"	50 1/2"	back
2	D	1 1/2"	3"	31 3/4"	legs
2	E	3/4"	4"	20"	feet
1	F	3/4"	1 3/4"	22 1/8"	back brace
1	G	3/4"	3"	20 5/8"	cross brace
Supplies					
1	16 1/4" × 48 3/4" mirror				
2	1/4" T-nuts				
2	1/4" × 2" bolts				
8	3/8" × 1 1/2" dowels				
	wood screws				



Calendar

Events of Interest to Woodworkers . . .

If your group is having an event you would like other woodworkers to hear about, please send us all pertinent information at least three months before the opening date. We will publish it for you in ***Calendar*** *free of charge.*

February 10-12, King of Prussia, PA

The Valley Forge Buyers Market of American Crafts will be held at the Valley Forge Convention Center in King of Prussia, PA. Craftspeople from across the nation will exhibit designs in metal, ceramics, fiber, wood and glass. All exhibits will be open from 10am to 6pm on Friday, Feb. 10, and Saturday, Feb. 11, and from 10 am to 5 pm on Sunday, Feb. 12. For more information contact: The Buyers Market, Tel. 1(800) 43-CRAFT .

February 11, Norman, OK

The Moore–Norman Vocational Technical Center will present a class entitled "Woodturning–Between Centers Turning." The class will look at the tools, techniques, and problems encounterd in working wood between centers on the lathe. For more information contact: Deanna Ewoldt, 4701 12th Ave. NW, Norman, OK 73069 (405) 364-5763

February 11, Bozeman, MT

A class in building "Sea Lion," a sailing pram, will be given by boatbuilder Simon Watts. For more information contact Scott Lohmuller at 3681 Sawmill Road, Kelly Canyon, Bozeman, MT 59715, (406) 587-3003

February 13-15, King of Prussia, PA

SKF Bearing Maintenance Institute will conduct an Industrial Maintenance and Service course at its King of Prussia headquarters. The three-day course is designed to teach maintenance personnel how to save time and money by reducing premature bearing failure and extending bearing life by up to 1000%. For more information contact: Raymond A. Guyer, Jr., SKF Bearing Services Co., 1100 First Ave., King of Prussia, PA 19406-1352, (215) 962-4804.

February 14-16, Baltimore, MD

The ACC Craft Fair's Winter Market of American Crafts will be held at the Baltimore Convention Center, Pratt & Charles St., Baltimore, MD on February 14-16. Artists in all mediums are presented: clay, basketry, fiber, jewelry, metal, mixed media, paper and wood. For more information contact: American Craft Enterprises, P.O. Box 10, 256 Main St., New Paltz, NY 12561, (914) 255-0039.

February 17–19, Chambersburg, PA

The Pennsylvania Guild of Craftsmen will present a workshop entitled: Beginning Bird Carving, with Bill & Grace White, at the White's studio in Chambersburg, PA. For additional information contact: The Pennsylvania Guild of Craftsmen, P.O. Box 829, Richboro, PA 18954 or call (215) 860-0731

February 18, Norman, OK

The Moore–Norman Vocational Technical Center will present a class entitled ""Woodturning-Bowl Turning." Each participant will be given an overview of the various aspects of bowl turning on the lathe. For more information contact: Deanna Ewoldt, 4701 12th Ave. NW, Norman, OK 73069, (405) 364-5763

February 24 , Chambersburg, PA

The Pennsylvania Guild of Craftsmen will present a workshop entitled "Intermediate Bird Carving" with Bill & Grace White at the White's studio in Chambersburg, PA. For additional information contact: The Pennsylvania Guild of Craftsmen, P.O. Box 829, Richboro, PA 18954 or call (215) 860-0731

March 18, Pottsville, PA

The Pennsylvania Guild of Craftsmen will present a workshop entitled "The Craftsperson in Business" with Libby Plateus, Pottsville, PA. For additional information contact: The Pennsylvania Guild of Craftsmen, P.O. Box 829, Richboro, PA 18954 or call (215) 860-0731

March 29—April 2, St. Paul, MN

The ACC Craft Fair'sAmerican Craft Expo will be held at the St. Paul Civic Center, downtown St. Paul, MN on March 29—April 2. Artists in all mediums are presented: clay, basketry, fiber, jewelry, metal, mixed media, paper and wood. For more information contact: American Craft Enterprises, P.O. Box 10, 256 Main St., New Paltz, NY 12561, (914) 255-0039

March 16, Lincoln, MA

The Society for the Preservation of New England Antiquities (SPNEA) will offer a course on "Three Centuries of American Furniture" on Thursdays, March 16-May 25, 1989, from 7–9 pm, at the Codman Carriage House, Codman Road, Lincoln, MA. The course is offered exclusively to SPNEA members at a cost of $175. Nonmembers are encouraged to register by enclosing an additional $25 to cover an annual membership. For additional information contact: SPNEA (617) 227–3956

March 18, Seattle, WA

A class in building "Sea Urchin," a 10 ft. traditional Nova Scotia rowing skiff, will be given by boatbuilder Simon Watts. For more information contact The Center for Wooden Boats at 1010 Valley St., Seattle, WA 98109, (206) 382-2628

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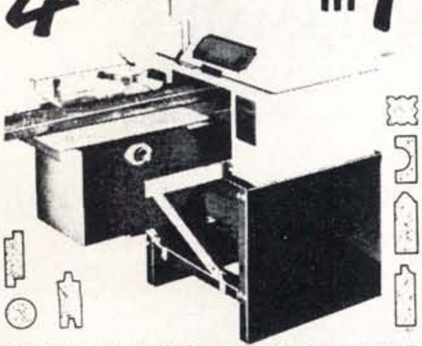

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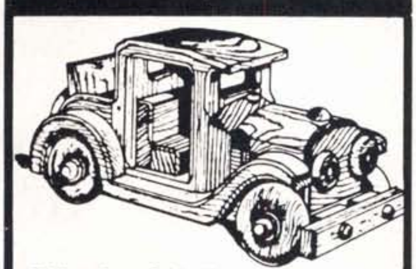

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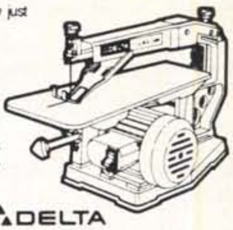

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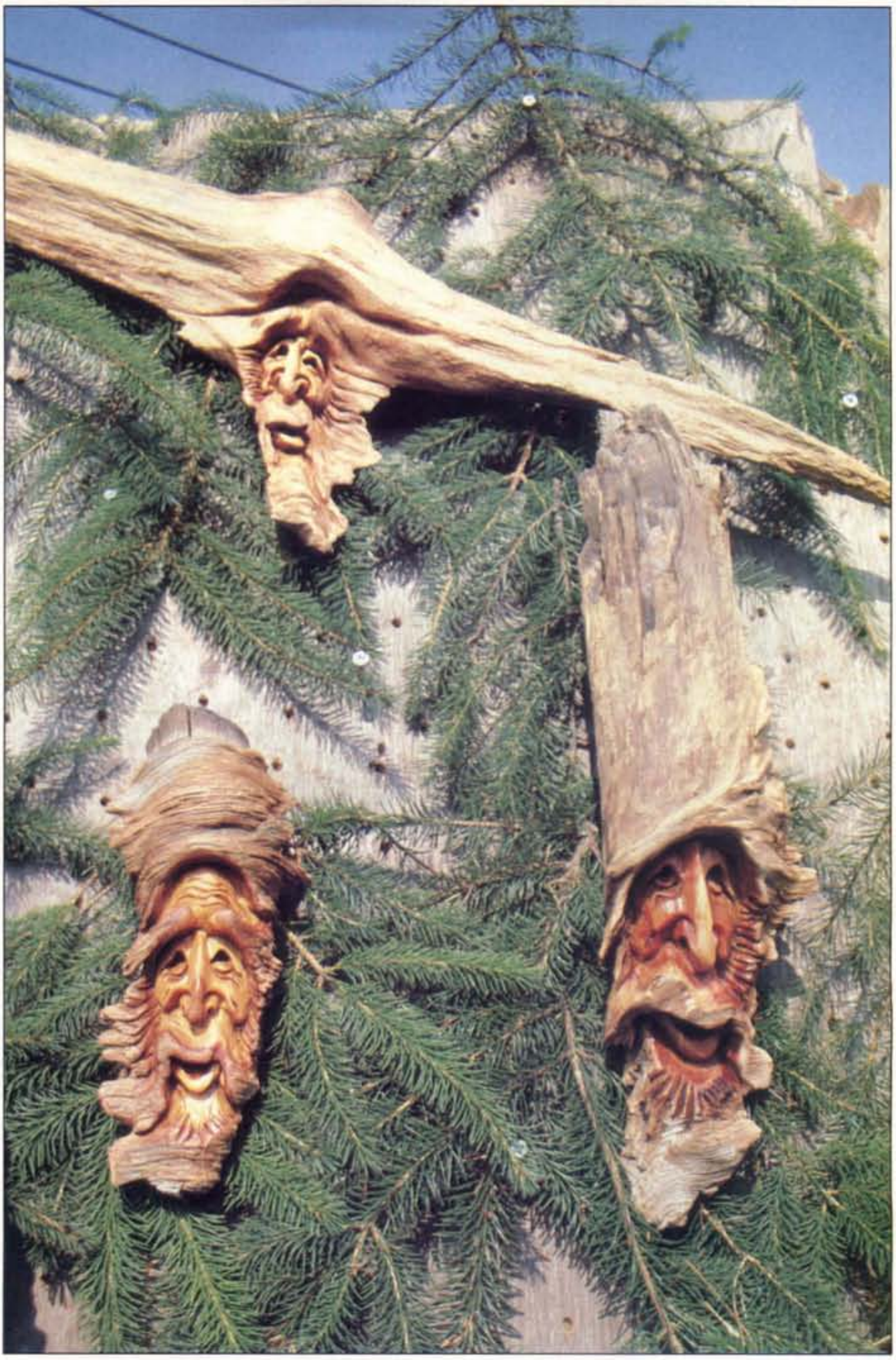

photos by the author

by Deborah R. Upshaw

Carving knots is an old craft you might like to try. Traditionally, knots are carved into faces—anything from Indian chieftains to amusing caricatures of politicians.

Once you begin, you may find yourself on a woodcarving adventure that will last for years. That's exactly what happened to Jennifer Rothrock, who's been carving pine knot faces for over ten years. Together with her partner, Rory Ernes, pine knot carving has become a hobby turned into a successful home–based business. They market their carvings to gift shops in different states, and they usually sell out the 100 or more carvings they take with them to crafts shows four times a year.

Here are some tips from Jennifer and Rory to help you get started carving pine knot personalities.

Tools

Any type of hand–held rotary tool, or a flexible shaft rotary tool (bench model or hang–up style) will work for this carving project. (Jennifer uses a hand–held Makita die grinder that spins at 27,000 r.p.m., and a Milwaukee die grinder that does 34,000 r.p.m.)

There are many manufacturers of these tools, and if you don't have one but are thinking of purchasing one, go back to *Popular Woodworking* Issue #32 (August/September 1986) and reread the article on rotary power tools by Ray Ternstrom.

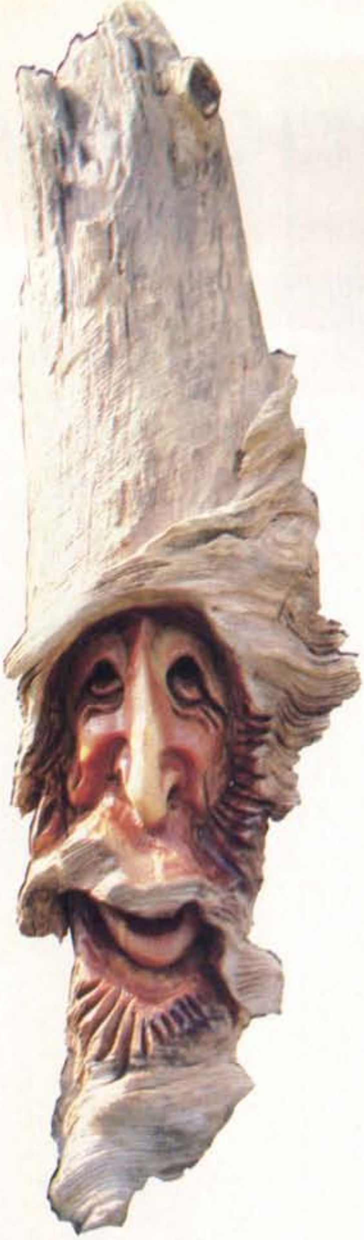
Go back even further, beginning with Issue #3 and several which followed, and you will find a series of lessons on power hand tool woodcarving by Spike Boyd, who describes the many uses and intricacies of working with such tools.

***Deborah R. Upshaw** is a freelance writer from Eureka, California and a frequent contributor to* Popular Woodworking.

Obtaining Knots for Carving

Any knot can be used, but ponderosa pine and sugar pine are the type that Jennifer and Rory recommend. Pine knots are taken from dead, fallen trees, many of which have been down for a hundred years or more. The knots are formed where the tree's limbs connect to the trunk. Quite a bit of pitch is stored in this area of the tree, which is why the wood is so well preserved.

The knots vary in color and luster. A lot depends on natural conditions, like weather or location, which influence their appearance. The colors range from a light, golden tan to a dark, reddish ebony. Some have a translucent, almost gemlike quality.



Rory suggests you use a pick or axe to break the knots off the trees, and says to be sure to take along plenty of burlap sacks to fill as you go.

Carving the Knot

Prepare the knots for carving by first cleaning them well with a wire brush. Knots that will be carved at a later date can be piled outdoors and simply covered with a tarp.

Jennifer recommends strapping the knot to a waist–high stand, which she says is an ideal height for carving. Use a dust mask, face shield, and ear plugs while you carve.

Begin roughing out the basic shape of the face with a large, oval–shaped bit, such as a Dremel #9933 or similar cutter. Jennifer uses an Arco #311.

Keep in mind that the natural shape of the knot will have a lot to do with the final outcome of your carving. For example, the vertical–shaped knots often become drawn out faces with tall top hats and long, pointed beards. You will want to leave the top and bottom portions of the wood as they are naturally, carving only the middle portion into a face.

Many of the horizontal–shaped knots lend themselves to male personalities with windswept hair, large flowing moustaches, wide–brimmed hats, and trailing beards. If you find "double knots," you can carve two faces on one piece of wood—a man and woman, or two brothers...leave it to your imagination!

photos by the author

After roughing out the face, use a tear–drop shaped bit (#121 or #124) to give the face still more definitive features. These are useful for rounding out the forehead, nose, cheeks and chin.

For working on the upper lip area on faces that will not have a moustache, Jennifer suggests using a #114, round, or a #131, oval. The #114 is also a good cutter for working on the lips and the eyes.

Next, use a small arrow–shaped cutter (#118 or #125) for adding details such as smile lines, crow's feet near the eyes, or other facial wrinkles.

Experiment with different cutters for varying effects, and always use sharp bits

Jennifer finds that carving a woman's face in a pine knot is a greater challenge than a man's face.

The couple's son, Jamin, climbs atop a mountain of pine knots.

so they won't tear or grab at the wood. Stop occasionally to blow away sawdust with an air compressor or a soft brush.

Rory found that by making cutters from old router bits on his bench grinder, he could provide Jennifer with cutters that could be resharpened again and again, and they would last for months. He uses 3/4" or 1/2" wide router bits, and grinds them to a rounded or pointed tip, leaving two flutes.

He suggests that when you use the bit, hold it at an angle using the whole side, almost like a scraper. He says these handcrafted, double–edged bits don't get clogged as easily from the pitch in the wood.

Finishing the Carving

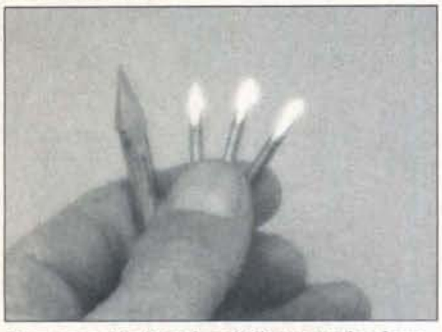
Use a contour sander (a rotary type that connects to an electric drill or other electric motor) to finish the surface. Jennifer recommends a flap–wheel sander, like a Sand–O–Flex, which she uses with a medium grit abrasive. After sanding, touch up the eyes, nostrils, mouth, or other facial features with your carving tool, if it needs it.

Next apply a coat of flat varnish using a small camel's hair brush and let it dry overnight. Jennifer suggests Ameritone flat–rubbed finish varnish, which she says gives excellent results—a coat applied in the morning will be dry by the evening.

Following this, use a 1/2" brush to apply a dark walnut stain into the deep crevices of the eyes, nostrils and mouth to give the face "shadows." After the stain dries, take another small brush and apply a high–gloss varnish to facial areas that you want to stand out, and as Jennifer suggests "leave a twinkle in the eyes."

After the carving is completely dry, use a wire brush to clean away any spots where excess varnish may have run over. Then drill a hole into the back of the carving and your pine knot personality is ready for hanging. **PW**

Jennifer roughs out the face using her rotary power tool. She uses rubber straps to secure the work.



Rory uses his bench grinder to make these cutters from old router bits.

Jennifer applies a dark walnut stain to give the face shadows.

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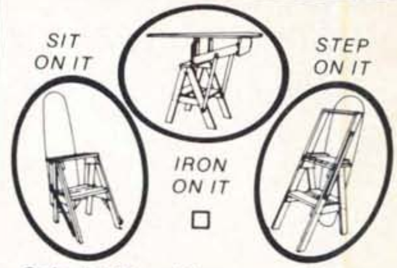

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Out of the Woodwork

by Hugh Foster

Advice from Krenov

Nearly a decade ago I had the great good fortune to be part of a very small group privileged to spend a day with James Krenov, cabinetmaker and woodworking philosopher. Krenov spoke and listened to us individually and collectively, signed our books, commented on our designs and let us sample the planes he describes so lovingly in his books. The day stands out as one in which I learned a great deal. What he spoke about was more than just woodworking. We discussed a way of working, a way of living, all without trying to push his views as though they were coming from "on high." Here are my notes on his comments just as I recorded them that day.

- Don't swamp yourself with the technical side of craft.
- Logic, caring curiosity....these are what art is made of.
- Don't worry. Not worrying is a beginning point from which one can start.
- Technique is the logical arrangement of tasks.
- Every time you do it, it must be an adventure (no matter what "it" may be)....
- He made many comparisons between woodworking and making music....Both are a question of attitude.
- Smile.
- How you feel about it, what it means to you, is all, especially so in our simple craft.
- Sharp tools, the right ones, and a good attitude: all you need to begin.
- Krenov's pieces weren't made for museums: some may end up there, but he regards them as common work, well done.
- Get enough [payment] for work so you won't feel humiliated—or else give it away....
- Enjoy the little things: bask in the intimacy of the process.
- Be on good terms with wood.
- Heavy work is a physical reality—at least for woodworkers.
- Work must be appropriate to the material.
- Wood is more than color and hardness: it demands method.
- Joining more rigid wood demands more precision.
- You need a "straight" eye more than a hyper–precise square.
- Don't limit yourself with tools.
- Oil finishes protect the most and darken the least, so they are best. But, inside [cabinets, drawers, etc.] oil will turn rancid.
- Use as few finishes as possible—know them and use them well.
- The closer you [physically] get to a piece, the more interesting it should become.
- Work by eye, but critical work must be accurate; mortising, etc., must be square.
- Joints must be strong; glue alone won't hold.
- Choose wood carefully—especially when working curves.
- You are (or should be) your own most critical customer.
- To compare yourself to others is a waste: individuality (with humility, sensitivity, and love) is all.
- A woodworker must have a vision.
- Be averse to too much symmetry.
- Don't worry about those "last five minutes."
- Energy + Optimism = Success.
- Experiment with shapes and balances.
- Too much joinery complicates the piece.
- Glue only two pieces at a time—allow 30 minutes of clamping time.
- Bar clamps should have toggles rather than cranks or wheels.
- Sharpen for the work at hand.
- Check plane irons from the back; the plane's mouth is critically important.
- You must have faith in what you're doing.
- Make the most of what you've got: enjoy the work.
- Do it the way you want to part–time, rather than full–time uphill all the way.

Each of the participants went home with his own message; those who attended thoughtfully got nearly enough message to last a lifetime. Working wood well, like living well, is a goal worthy of our pursuit. Thank you, Mr. Krenov, for helping to illuminate the way. **PW**

***Hugh Foster** is a part-time furniture designer/builder in Manitowoc, Wisconsin.*

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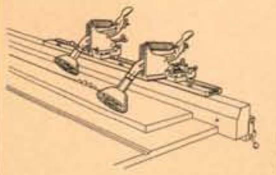

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